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ELEMENTS OF COSTING

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PREFACE

THIS book has three primary objects:

First, to provide teachers of Costing with a clear, concise and logically arranged exposition of the essential elements of this intricate subject—an exposition upon which they can base their own instruction, and one which their students can use intelligently for reference and revision;

Secondly, to provide students with a readable text-book which will interest them, and enable them to acquire a thorough knowledge of the fundamental principles of Costing and their application in a practical manner; and

Thirdly, to provide costing clerks and others engaged in industrial concerns with a clear guide which will enable them to understand the theory of Costing and to install satisfactory costing systems in their own works.

It is hoped that the book will serve the needs not only of students taking the examinations of the various professional and educational examining bodies, but also of those seeking a practical knowledge of the subject with a view to the application of the principles of Cost Accounting in their daily work.

The book has been written on the assumption that readers possess a knowledge of the elementary principles of book-keeping and accounts.

It is sub-divided in such a way as to show the various aspects of the subject in logical sequence, and is copiously illustrated throughout with forms and accounts that are actually used in practice. In the majority of cases the illustrations have been completed with specimen figures for purposes of clarity. At the end of each chapter is inserted a set of test questions based upon the reading matter contained in the chapter, and it is hoped that this feature will assist students in retaining the subject matter of the book. A glossary containing numerous terms and phrases used in costing has been added and it is believed that this will prove of value to examination candidates.

Specimen examination papers set by The Society of Incorporated Accountants and Auditors, The London Association of Certified Accountants, and The Royal Society of Arts are included in the Appendix, and acknowledgment to the foregoing bodies is due and is here accorded.

G. R. G.
R. G. W.

THIRD EDITION

In the preparation of the third edition, further extensions have been made to the text-matter in order to conform with modern practice, while the subject-matter of the additional chapters on Control Accounts, Contract and Production Accounts, Uniform Costing, Standard Costing and Budgetary Control introduced into the second edition has been elaborated.

The Glossary of costing terms and definitions has been extended in accordance with the approved code of costing terminology published by the Institute of Cost and Works Accountants, and acknowledgment to this professional body is due and is here accorded.

The test questions at the end of the various chapters have been extended and include further questions from the papers set by the leading examining bodies in Costing.

The specimen examination papers have been brought up-to-date by the inclusion of the latest papers set by The Institute of Chartered Accountants, The Society of Incorporated Accountants and Auditors, The Association of Certified and Corporate Accountants, The Institute of Cost and Works Accountants, The Royal Society of Arts and The London Chamber of Commerce, and the authors take this opportunity of thanking these examining bodies for the right of reproduction.

The authors are indebted to many readers for helpful suggestions and expressions of appreciation and they are gratified to find that their work continues to satisfy the requirements of professional and commercial examiners in Costing.

G. R. G.
November, 1942. R. G. W.

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CHAPTER I

THE PRINCIPLES OF COST ACCOUNTING

Introduction.

The science of cost accounting may be said to have resulted from the growth of industrial activities, combined with the development of the competitive element in modern business. Although this particular branch of accounting has not been adopted unanimously by manufacturers and others in this country, there is no doubt that an efficient costing system is a fundamental necessity for the sound conduct of manufacturing and productive operations.

The existence of an accurate system of financial accounts will reveal the general position of a business, but it will not furnish the special detailed information that is derived from an efficient costing system—information that is necessary in connection with the internal control and management of a business. The stress of modern competitive business requires not only a knowledge of the general results of trading, but also of the cost of each individual article or class of goods manufactured, with a view to ascertaining the percentage of profit or loss which will result from each distinct trading operation. This information, as will be seen later, is given by the institution of a special system of accounts for costing purposes.

The introduction of costing in a business should supply the actual cost of each class of item produced, and may enable a manufacturer to concentrate upon the production of profitable articles and, wherever practicable, the elimination of unprofitable articles. Furthermore, when tendering for orders the possibility of losing profitable orders through tendering too high, or of obtaining unprofitable orders through tendering too low, should be minimised. The maintenance of an efficient system of costing is particularly necessary in wartime when so many factories are engaged, directly or indirectly, in the manufacture and production of war-time requirements.

Essentials of a Costing System.

In the first place, any system of cost accounts must be *accurate,* as the results derived therefrom are of little value unless the elements of uncertainty and wide approximation are absent. The percentage of variation should never be considerable, and the ultimate results should be capable of close reconciliation with the corresponding financial results as shown by the financial books of the business in order to ascertain that all expenditure shown in the financial accounts is included in the cost accounts. Therefore it is advisable that the costing accounts should be compiled from the same original records, as far as possible, as the financial accounts.

Furthermore, the reader must bear in mind that adequate results cannot be obtained without incurring both trouble and expense. It will be found in actual practice that the cost of instituting and maintaining a sound costing system is compensated by the undoubted economies which it effects. Unless a manufacturer is prepared to devote both time and money to obtaining efficiency in his costing system, it is better for him to dispense with any system than to depend upon one which results in information of a misleading nature. On the other hand, an endeavour should be made to obtain adequate results without incurring unjustifiable expense. Experience goes to show that cost department salaries should not, on the average, exceed more than 1 per cent to 1½ per cent of the total payroll of the concern, and that the total expenses should not exceed ½ per cent to 1½ per cent of sales.

Finally, there must be sympathetic co-operation between the Works and Cost Office Staffs. The method of collating the necessary data for the costing department must be made as simple as possible, but efficiency and adequacy must not be sacrificed to this end. It is not sufficient that the costing data should be accurate, but it must also be available within a reasonable period and it must be fully utilised by the management. The Cost Accounts should be arranged on the double-entry principle and frequent reconciliation should take place with the information shown in the Financial Accounts; or, alternatively, a system of interlocking the two sets of accounts by means of control accounts should be adopted.

Objects of Cost Accounting.

The main objects of any system of cost accounting may be summarised as follows:

1. To obtain the cost of:
    - (*a*) Any manufactured article;
    - (*b*) Any unit of production;
    - (*c*) Any constructional work forming the object of a contract, or job;
    - (*d*) Any particular process of manufacture; or
    - (*e*) The supply of any services, involving the maintenance of any form of power.

2. To obtain information as to whether it is profitable to produce any portion of a job, contract or article, or to perform any required process or operation, or whether it is more profitable to purchase any particular manufactured part, etc, from outside suppliers.

3. To provide reliable information on which estimates for future orders may be based, and to serve as a general guide for the fixing of profitable selling prices.

4. To establish a standard of cost for stock articles with a view to providing a basis of their cost for future purposes.

5. To ascertain whether any leakages in materials, labour or expenses are taking place, and, if so, their nature and extent.

6. To obtain information as to the productive capacity of

any machine or plant, and to reveal any wastage and possible improvements in productive methods.

7. To provide a perpetual inventory of stores and other materials, and to indicate slow-moving stocks and thus minimise the amount of capital locked up in raw materials, work in progress and finished goods.

8. To show what the standard cost of production should be under normal conditions, thus enabling the actual costs to be compared with the estimated standard costs.

9. To provide data in the form of reports and statistics in order to facilitate, *inter alia,* the preparation of interim financial accounts.

The maintenance of an efficient system of costing is essential not only in normal times, but also in times of depression or in times of trade booms, as in bad times inefficiencies in production will be revealed and can then be curtailed to minimise possible financial losses (or even convert possible losses into actual profits), while in good times leakages can be prevented or at least minimised in order to increase the margin of profit.

The manner in which the above information is obtained by means of an efficient system of cost accounting will be explained in detail in later chapters.

Estimating and Costing.

It will be observed that one of the main objects of any system of cost accounting is to provide reliable information on which estimates for future orders may be based, and it must be appreciated that estimating differs in many respects from costing.

Estimating is the predetermination of the *probable* cost of a particular job, article, process, etc., under a given set of conditions, and it is based on the market price of materials and rates of labour at the time of estimating, but having regard to the possible fluctuations in such prices and rates in the immediate future.

Costing, on the other hand, is the ascertainment of the *actual* detail and total cost of a particular job, article, process, etc., and it is based on the actual cost of material, labour and expenses.

It has been said very aptly that " an estimate is an opinion, cost is a fact and price is a policy."

Elements of Cost.

The Elements of Cost consist of materials, labour and expenses, and each of these component items may be subdivided into *direct* and *indirect* items as follows :

1. *Prime Cost,* comprising :
    - (*a*) Direct materials ;
    - (*b*) Direct labour ; and
    - (*c*) Direct expenses.
2. *Oncost,* comprising :
    - (*a*) Indirect materials;
    - (*b*) Indirect labour; and
    - (*c*) Indirect expenses.

For example, in the case of a house builder engaged in developing a building estate, the division between direct and indirect items of cost may be illustrated as follows :

(1) Direct materials—bricks, lime, cement, tiles, timber and glass.

(2) Direct labour—wages of bricklayers, plasterers, roofing and wall tilers, and joiners.

(3) Direct expenses—carriage on direct materials, transport of workers and hire of scaffolding and other apparatus.

(4) Indirect materials—nails and screws.

(5) Indirect labour—wages of foremen and night watchmen.

(6) Indirect expenses—depreciation of plant and builder's office administrative expenses.

PRIME COST includes all expenditure in labour, materials and services which can definitely be allocated or charged to a specific article, process, job or contract.

ONCOST includes all *indirect* expenditure which cannot definitely be allocated or charged to a specific article, process, job or contract and which therefore must be spread over all the work. Oncost may, for purposes of convenience, be sub-divided into four groups as shown on the opposite page.

Composition of Total Cost.

All expenditure which can *directly* be allocated or charged to a specific job, contract, etc., is, as already stated, termed *Prime Cost.*

All expenditure which *cannot* directly be allocated or charged to a job or contract is termed *Oncost.* This term is a very convenient one as it is both brief and comprehensive, signifying all indirect revenue expenditure which is added to the prime cost, and the term is certainly preferable to such alternative expressions as " Expense Burden," and " Establishment Charges." On the other hand, it is advisable to note that some authorities favour the term " Overheads " in place of the term Oncost.

In this work the authors have used the expression " Oncost," and this term should be taken as synonymous with the term " Overheads."

The prime cost of an article, etc., plus the works oncost thereon is said to be the *Works Cost,* while the addition of office (or administrative) oncost and selling and distributive expenses to the works cost represents the *Total Cost* of the same article, etc. The various elements in the composition of the total cost will be explained in detail in later chapters, but at this stage they may be shown diagrammatically in the form adopted on page 8.

ONCOST

WORKS (OR FACTORY) ONCOST		OFFICE (OR ADMINISTRATIVE) ONCOST	SELLING EXPENSES	DISTRIBUTIVE EXPENSES
Wages of: Foremen. Supervisors. Labourers. Enginemen. Stokers. Toolmakers. Electricians. Cranemen. Blacksmiths. Timekeepers. Gatekeepers. Cleaners. Maintenance Materials (Belting, solder, oils, soap, wipers, etc.).	Depreciation and Maintenance of Plant, Machinery and Factory Buildings. Rent, Rates and Taxes of Factory, etc. Motive Power. National Insurance on Indirect Labour. Ambulance Supplies. Carriage Inwards (where this cannot definitely be allocated to purchases without elaborate analysis).	Directors' Fees. Clerical Salaries. Rent, Rates and Taxes of Office. Sundry Expenses. Stationery. Postages. Telegrams. Telephone Charges. Depreciation and Maintenance of Office Furniture, Fittings and Buildings. Audit Fees, etc.	Advertising (certain exceptions). Travellers' and Salesmen's Salaries and Commission. Rent and Rates of Showrooms. Exhibition Expenses Catalogues.	Packing Materials. Carriage or Freight Outwards. Rent and Rates of Warehouse. Wages of Packers and Transport Staff. Maintenance and Depreciation of Motor Transport.

Direct Labour and Direct Materials and Direct Expenses

PRIME COST

Works (or Factory) Oncost (Indirect Labour, Materials and Expenses)

WORKS (OR FACTORY) COST

Office (or Administrative) Oncost

Selling and Distributive Expenses

TOTAL COST.

The addition of the percentage or margin of profit to (or the deduction of the margin of loss from) the total cost will therefore represent the selling price of the article, job, contract, etc.

The actual *total* cost of production as represented by the works cost plus office oncost, over a given period, is shown in more or less detail in the Financial Trading and Profit and Loss Accounts, but such figures are useful for costing purposes only as a check on the cost records. Furthermore, the Profit and Loss Account includes items of expenditure which may be excluded from the cost records. Such items are shown on the preceding page under the headings of "Selling and Distributive Expenses," but it should be noted that the exclusion of such items is a matter of some controversy among costing authorities.

The authors favour the exclusion of "Selling and Distributive Expenses" as explained later on page 107.

The item "Advertising" could be included under "Selling and Distributive Expenses" if such expenditure was absolutely necessary for the whole of the products of the factory or works. If, however, the advertising expenditure was incurred only in connection with a particular line of products, an effort should be made to recover the expense as a direct charge against that line of products.

With regard to the items falling under the heading of "Works Oncost," it is understood, of course, that the wages paid to electricians, toolmakers, blacksmiths, cranemen, etc., relate to work of a general character, which cannot directly be allocated or charged to any particular jobs or contracts.

If the item "Carriage Inwards" is capable of analysis without the expenditure of considerable time, any portion of the expense which can directly be applied to specific raw materials should be so treated.

The item "Taxes" in both the works oncost and office oncost is understood to mean *local* taxes only, as distinct from Income Tax, which is an *appropriation* of profits and not an expense of production, *i.e.*, a charge against profits.

Test Questions

A. What are the objects of instituting a system of Cost Accounting?

B. Would a Costing Department be of any service to the following:

(*a*) Motor Garage Proprietor;
(*b*) Tailor and Cutter;
(*c*) Solicitor;
(*d*) Bill Poster;
(*e*) Auctioneer?

Give reasons for your answers.

C. What are the objects of Cost Accounts and what tests can be applied so as to ensure their accuracy as far as possible?

D. What results are to be obtained from the keeping of Cost Accounts that cannot be obtained from the usual Financial Accounts?

E. Tabulate the "Elements of Cost," showing the usual items of expenditure appertaining to each.

F. What do you understand by :

Prime Cost;
Works Cost;
Office Expenses; and
Selling and Distributive Expenses?

G. Under what headings may "Oncost" be sub-divided? Write down each of the following items under the appropriate heading :

Belt Fasteners.

Timekeepers' Wages.
Salaries.
Depreciation of Motor Lorry.
Audit Fees.
Ambulance Supplies.
Repairs to Experiment Shop.
Carriage (Inwards and Outwards).

H. One of the elements of Prime Cost is "Direct Materials." Give examples of the items you would consider to be included under the term "Indirect Materials."

J. Mention six items which would fall under the heading of "Selling and Distributive Expenses," and state whether such items should be included in the costs of production or not. Give reasons for your answer.

K. Taking an ordinary Financial Trading and Profit and Loss Account, marshal the items into groups representing:

(*a*) Manufacturing Expenses

(*b*) Administrative Expenses.

(*c*) Selling Expenses.

L. A manufacturer tells you that the establishment of a Costing Department would involve too much expense. Write a short letter in reply, stating why you do *not* agree with him.

M. Give a few examples of the various ways in which Cost Accounts assist the executive or management of a business.

N. It has been said that Cost Accounts are the key to economy in manufacture. Explain this statement.

O. Distinguish between the terms "Costing," and "Estimating."

P. To a suggestion made by you to a client (a Toy Manufacturer) that a system of Cost Accounts should be suitable, he replied that such a system was unnecessary, too expensive and impracticable owing to the nature of his business. Further that his workmen would have so many forms to fill up that they would have no time left for the purpose of manufacture. Answer these objections.

CHAPTER II

METHODS OF COSTING

Selection of Method.

The essence of cost accounts may be said to be *analysis*, and the form which this analysis of direct and indirect items of expense will take depends primarily upon the particular circumstances of each individual business. No doubt the reader will be aware that the fundamental principles underlying the financial accounts of all businesses are well defined, but that the form of the final accounts themselves are framed so as to correspond with the organisation and special requirements of the particular business concerned.

Similarly, it is not practicable to devise a uniform system of cost accounts that may be applied to every individual industry. The system of costing adopted in any particular case must be designed to suit the business under consideration, and there must be no attempt to make the business fit into any rigid costing system. As in the case of financial accounts, the underlying theoretical principles are fairly definite, but the practical application of those principles is determined solely by the nature of each particular industry or business. It will be quite obvious, for example, that the system of costing used in an engineering establishment could not be equally applied to a chemical works.

It is suggested that the following general conditions should be observed when installing a costing system :

1. The system must be framed and adapted to suit the requirements of the business, without involving drastic alteration of the existing organisation of the business.

2. The system must represent a profitable investment to the manufacturer, etc., *i.e.*, the cost of installing and maintaining the system must be more than offset by the economies effected.

3. The system must be simple but practical and unnecessary elaboration should be avoided, *e.g.*, the various forms to be filled in by workers should involve as little clerical work as possible to ensure the fullest co-operation.

4. The system must be elastic and readily adaptable to any change in the requirements and general conditions of the business.

5. The system should provide for the presentation of all costing data at frequent and regular intervals with a reasonable degree of promptness.

6. The system should be interlocked with the general financial accounting system, or capable of close reconciliation therewith, so as to ascertain that all expenditure appearing in the financial accounts is recorded in the cost accounts.

General Sub-division.

The methods of costing at present in use may be divided into the three following general classes:

(*a*) *Job* Costing, where each batch or unit produced is quite distinct from others and can be readily separated;
(*b*) *Process* Costing, where production involves continuity through a distinct series of processes, the same product being produced for fairly lengthy periods of time; and
(*c*) *Operating* Costing, where services are rendered rather than goods produced.

It is now proposed to give a general indication of the types of industries, etc., to which these three main methods of costing are applied, and of various other methods which are closely related to certain of the aforementioned methods.

Job Costing.

The Job Costing method is applied to industries that produce a definite article, or series of articles, or that undertake any work of a constructional nature. It is particularly suitable in all cases where it is desired to obtain the cost of a number of contracts of an entirely distinct and non-recurring nature. This method of costing can therefore be applied, *inter alia*, to the following types of businesses:

Engine Makers' Establishments.
Machinery Makers.
Builders' and Contractors' Works.
Shipbuilding Works.
Motor Repair Garages.
Reinforced Concrete Works, etc.

Various other terms are applied to Job Costing, such as "Terminal," "Contract," "Special Order," etc., but the term "Job" is more usual and will be used throughout this work. The terms "Terminal" or "Contract Costing" are generally used in the case of constructional work, *e.g.*, builders, while the term "Special Order Costing" is used where the costing is based on a single order consisting of one or more articles, *e.g.*, machinery manufactures.

Process Costing.

The Process Costing method is applied to industries that produce the finished material by means of a series of processes, or stages, in any of which processes, or in the finished state, it would be impossible to trace prime cost expenditure to a given order. It is particularly suitable in all productive industries where by-products and residuals naturally occur. This method of costing shows the expense for each process and it is applicable to the following industries, amongst others:

Chemical Works.
Soap Works.
Artificial Silk Factories.
Varnish Works.
Textile Mills.
Paper Mills.
Tanneries.
Chromium Plating Works, etc.

In some manufacturing concerns it may be possible, and even necessary, to apply either a combination of the Process and Job methods of costing, or both methods side by side.

The clerical labour involved in the compilation of Process and similar methods of costing is much less than that required for Job Costing. For example, there may be only two or three to half-a-dozen processes in one manufacturing concern, whilst in another concern, where Job Costing is in operation, there may be a considerable number of jobs, each of which requires separate treatment in the costing records.

Operating Costing.

The Operating Costing method, which is sometimes referred to as " Working " or " Running " costing, is applicable to those concerns where services are rendered rather than goods produced; *e.g.*, railways, tramways, fleets of motor lorries, electric power stations, etc. The costs are based on a well-defined unit; *e.g.*, train-mile, ton-mile, kilowatt-hour, Board of Trade unit, etc.

Although in actual practice the three above costing methods are the most general, there are other methods utilised in certain industries. These methods, which are explained in the following paragraphs, are more or less related to the " Process " costing method, although it is contended that Multiple Costing is more related to Job Costing than to Process Costing.

Single (or Output) Costing.

The Single (or Output) Costing method (also referred to as Unit Costing) may be regarded as a variation of Process Costing, a single product being manufactured or extracted with little actual conversion by distinct processes. This method is applicable to businesses and industries where the article manufactured or produced is a product of a uniform type, such as coal, beer, flour, marble, bricks, etc. In such industries the costs are obtained on the basis of a " natural " unit of output, such unit being the basis of the selling price of the commodity; *e.g.*, a ton of saleable coal (in a colliery), a standard barrel of beer (in a brewery), etc.

The average cost is obtained by dividing the classified items of direct and indirect expenditure by the total number of units of the production; *i.e.*, the output, during a given period.

Multiple Costing.

The Multiple Costing method is utilised by businesses where the production comprises a variety of articles that differ in type, size, and value and in the number and variety of processes that are necessary for the completion of a finished article. This method of costing is applicable where such articles as the following are manufactured:

(*a*) Boots, shoes, slippers, leggings, etc.
(*b*) Hosiery and woollen goods.
(*c*) Electrical fittings.
(*d*) Motor and cycle accessories.
(*e*) Wireless and gramophones.

The products are divided into groups, or classes, and the expenditure in materials, labour and other expenses is recorded separately for each class, or group.

Multiple Costing is also sometimes referred to as "Composite Costing."

Batch Costing is a method of ascertaining the cost of 'groups' or 'batches' of similar articles. Each batch being treated as a unit. This practice has been largely adopted by the aircraft industry and by the manufacturers of aero engines and components.

Departmental Costing.

The Departmental Costing method is a combination of the Job and Process Costing methods, and is employed in businesses which are capable of being divided into a number of distinct departments, and where it is desired to obtain the cost of each department separately, *e.g.*, printers and publishers, departmental stores, etc. In this case, Job Costing is applied to the articles produced as far as prime cost is concerned, and oncost is allocated to each department only in respect of the articles which are dealt with in that department.

For the purpose of avoiding confusion in the reader's mind, it will be opportune here to make a brief reference to three terms, *viz.*, " Municipal Costing, Uniform Costing and Standard Costing," as these are, strictly speaking, not methods of costing in the same sense as the above descriptions.

Municipal Costing.

This comprises any one or more of the above methods of costing according to the nature of the works and services undertaken; *e.g.*, Housing—Job or Contract Costing; Gas or Electricity—Process Costing; other Services—Unit Costing.

Uniform Costing.

This is the similarity of procedure and bases of computation, percentages, etc., in compiling the data in the appropriate method of costing used by manufacturers or groups of manufacturers in a given industry.

Standard Costing.

This constitutes a method of controlling or checking the degree of productive efficiency as revealed by a comparison of the standard cost with the actual cost.

Uniform and Standard Costing are dealt with more fully in Chapter XIV.

In times of national emergency, use is also made of Cost-Plus Costing and Target Costing.

Cost-Plus Costing.

This refers to contracts placed with contractors on the basis of prime cost plus an agreed sum or percentage to cover oncost and profit. The prime cost refers to direct labour, materials and admissible direct expenses, such as plant hire, transport of materials and plant, etc. Great care is necessary to see that only agreed items are admitted to the cost. This method is usually adopted only when there is need for rapid execution of contracts without waiting for the fixing of definite contract prices, as in wartime, and the method is not regarded as satisfactory in normal circumstances owing to the possibility of abuse and the lack of incentive to minimise costs.

Target Costing.

This method is used in connection with large constructional contracts, and involves the careful calculation of anticipated prime cost, usually by experienced surveyors in consultation with accountants. This anticipated cost is treated as the Target Cost, and on the cost so determined the contractor is paid either an agreed percentage or a fixed sum to cover his oncost and profit. The percentage may be determined by tenders, the lowest being usually accepted, or it may be one agreed directly with the contractor. In order to encourage economical work, it may be agreed to give the contractor a predetermined bonus, such as a percentage of the saving on the target cost. Clauses may be inserted in the contract to provide conditions for unascertainable increases in such items as subsequent rises in wage rates, prices of materials, etc., and the cost of any required deviations from the work to be added to the target cost.

In the case of both the above-mentioned methods of costing, accountants independent of the contractor are usually employed to scrutinise the costing records and accounts.

Units of Cost.

The unit of cost of any particular business is an important factor in determining the method of costing that should be adopted with a view to giving the most efficient and satisfactory results, and it is essential that the unit adopted should be practicable, not too large and not too small. The unit of cost will obviously be different in distinct industries, and it may also vary as regards concerns in the same industry, while different units may be used in the distinct sections of a single business.

In this connection it is considered advisable to indicate the units of cost of various typical businesses, and the reader is advised to memorise these given units and to endeavour to visualise the unit that would be adopted in any other type *of business.*

Business.	*Unit of Cost.*
Mines and Quarries	*Ton of ore, stone, etc., raised.*
Gold Mines	*Ounce of gold recovered; ton of ore crushed or treated.*
Steel Works	Ton of steel.
Collieries	Ton of saleable coal raised.
Breweries	Standard barrel of beer brewed or racked.
Flour Mills	Standard sack of flour.
Paper Mills	Ton of paper or pound of paper.
Brickworks	1,000 bricks made.
Biscuit Factories	Tin (standard) or cwt. of biscuits.
Textile Factories	Yard of material.
Spinning Mills	Pound of yarn.
Hotels	Visitor per day.
Gasworks	Therm; or 1,000 cubic feet of gas sold; or ton of coal carbonised.
Waterworks	1,000 gallons of water consumed.
Electric Power Stations	Ton of coal used; kilowatt-hour; or 100 Board of Trade units sold.
Railways	Ton-mile (for goods traffic) or passenger-mile (for passenger traffic).
Tramways	Car-mile or passenger-mile.
Envelope Manufacturers	1,000 envelopes made.
Electro-Plating	Square inch plated, or per standard article.
Hospitals	Occupied bed.
Road Construction	Cubic yard of excavation and fillings.
Road Surfacing	Superficial square yard.

In actual practice, the difficulty arises of determining exactly which costing method should be applied to a particular business, and it must be emphasised that a wide and detailed consideration should be paid to all the circumstances involved with a view to adopting or propounding a scheme which will most adequately provide the information required by the management. It is again emphasised that it is not practicable to allocate any particular method of costing to any given industry, as different methods may be employed by concerns in the same industry, or two or more distinct methods may be employed in a single business.

Test Questions

A. What are the determining factors that a manufacturer must take into consideration when deciding the particular method of costing that is most suitable to his business?

B. Define the following terms :

(*a*) Operating Costing.
(*b*) Departmental Costing
(*c*) Multiple Costing.
(*d*) Process Costing.

C. What method of costing would you apply to the following industries?

(*a*) Furniture Manufacturer.
(*b*) Slate Quarry.
(*c*) Boot and Shoe Manufacturer.
(*d*) Motor Bus Service.
(*e*) Iron and Steel Re-rolling Mill.
(*f*) Colliery.
(*g*) Paint Manufacturer.
(*h*) Gasworks.
(*i*) Printer.
(*j*) Shipbuilding.
(*k*) Weaving.
(*l*) Oil Refining.
(*m*) Power Station.
(*n*) Motor Haulage.

D. Explain fully the difference between the "Job" and "Process" methods of costing. Name any industry with which you are familiar and state which of these methods you would apply and why.

E. To which particular method of costing are both the "Job" and "Process" methods applied in conjunction? Briefly indicate the manner in which this combination of methods is effected.

F. What do you understand by the term "Unit of Cost"? Give the units that you consider most applicable to, and most used in, any four industries known to you.

G. What would you take as the unit of cost in the following cases?:

(*a*) Iron Foundry.
(*b*) Electricity Undertaking.
(*c*) Brewery.
(*d*) Building Contractor.
(*e*) Railway Company.
(*f*) Gold Mine.
(*g*) Brickworks.

H. Explain briefly the uses of the following terms:

(*a*) Municipal Costing.
(*b*) Cost-plus Costing.
(*c*) Target Costing.
(*d*) Uniform Costing.

CHAPTER III

PRIME COST—DIRECT LABOUR

One of the elements of cost given under the heading of Prime Cost in Chapter I is " Direct Labour " ; that is, Wages which can be directly, or definitely, allocated or charged to a particular Job, or Contract.

In the present chapter it is proposed to deal fully with this particular element, special attention being paid to the following matters :

(*a*) Methods of recording Workmen's Time ;

(*b*) Method of recording Wages in the Wages Book ; and

(*c*) Incidentally, a method of counting out the Workmen's Pay, in order to facilitate the location of errors.

A detailed consideration of the principal modern methods adopted in practice for the remuneration of workers will be deferred until the following chapter.

It will be found that even in those concerns where a costing system is dispensed with, there is some fixed system for dealing with the calculation and payment of the wages of employees. Therefore in the institution of a system of cost accounts the existing system as regards wages should be utilised as far as possible for the ascertainment of prime cost charges. Generally it will be found that considerable modifications are necessary in order to ensure the detailed information of labour costs required for costing purposes.

There may be said to be two separate and distinct records of time necessary for costing purposes, the first being the basis for the compilation of the pay roll at the end of each week and the second the detailed analysis of labour costs into the individual jobs upon which such labour has been expended.

Records of Employees.

An efficient wages system cannot be said to be complete without the keeping of a detailed record of all employees by means of specially ruled cards which are usually filed in card index cabinets. These cards enable all information, as regards any particular employee, to be available as and when required. It should be noted, however, that these cards are merely kept for memorandum purposes, and do not enter into the general system of time records. The details usually recorded by such cards are clearly indicated on the following specimen form:

EMPLOYEE'S RECORD CARD.

Name	Address	Date Engaged	Age	Trade	Number

Previous Employer..

Reasons for leaving Employer....................................

Character ....

WAGES.

Engaged at	Increase		New Rate of Wages	Increase		New Rate of Wages
	Date	Amount		Date	Amount	

National Insurance

Health ....

Unemployment ....

Date of Discharge..

Reasons for Discharge..

It is suggested that separate records should be kept for Income Tax deductions from employees' remuneration.

When a worker is given an increase in wages, a *Wages Advice Note* is made out and sent to the cost office and wages department so that the necessary alterations can be recorded. When a worker is discharged or terminates his employment for any reason a *Discharge Note* is made out so that his name can be removed from the wages record. Before the worker is paid off he is required to return any tools which may be in his possession, and obtain a *Tool Clearance Receipt* from the tool store in respect thereof. If any tools which have been handed to him have been lost or carelessly damaged, the monetary value of the loss will be indicated on the Tool Clearance Receipt, so that the necessary deductions can be made from his wages; but this method of imposing penalties is not adopted universally.

Methods of Recording Workmen's Time.

The first essential is the ascertainment of the total time spent inside the factory, etc., for which the workman is entitled to draw wages, while the second essential is the ascertainment of the actual time spent by the workman upon each separate job, process, operation, etc., in order to ascertain the correct labour charge to each separate unit. There is bound to be some difference between the total time spent inside the factory and the actual time spent on productive work, and any such difference must be investigated and accounted for. A certain part of the difference between the two times will be unavoidable, *e.g.*, the time spent in getting to and from the works entrance to the worker's own department, and an allowance can be made for such unavoidable idle time.

If the difference exceeds the agreed allowance for normal idle time it is essential that any abnormal idle time should be subject to thorough investigation.

Whether payment is made according to the quantity of work produced, termed " Piece Work," or per hour, day, or week, termed " Time Work," the basis is usually the hourly time occupied on such work. In either or both cases, therefore, it is necessary to ascertain the number of hours each workman has completed during the period for which payment is to be made.

The two chief methods of recording workmen's time are the *Check* or *Disc* method and the *Time-Recording Clock* method. These two methods will be explained in the following paragraphs and the reader must remember that, although authorities differ as regards the merits of each method, there are distinct advantages to be found in both cases. It is usually found, however, that a proportion of the detailed clerical work may be eliminated and more indisputable and accurate records obtained by the use of mechanical devices.

Check or Disc Method.

The original method of time recording was that which relied entirely upon the records of a "watchman" or timekeeper, who noted the times of all workmen on entering and leaving the works. The inevitable disputes associated with this method soon caused it to fall into disrepute, therefore it can be ignored in considering modern practice. It should be borne in mind, however, that this system is still adopted, particularly in the case of "outside contracts," *e.g.*, in the case of the employees of the smaller type of builder and contractor engaged on work away from the builder's yard.

The check or disc method was then instituted, as representing an improvement on the pre-existing method. This method, which is still in use in many concerns, but which is gradually falling into disuse, usually involves the use of a board or boards, containing numbered hooks, hung at the entrance to the works or factory. Each workman is provided with a metal disc or "check" bearing his particular number. This check is pierced with a hole and hung on the particular hook bearing the corresponding number to that shown on the check.

The workman, on entering the factory, removes the check bearing his number from the board and deposits it through a slot into a box provided for its reception. On the expiration of the few minutes grace usually allowed after the time of starting, the box is removed, and another box, called the "late" box, is substituted. Into this late box the late-comers deposit their checks.

The boxes are emptied periodically by the Time-keeper, who then makes a record of the checks in a Time Book as shown by the specimen entry on page 27.

A boy then hands the checks round to the workers in the various shops, or the checks are replaced on the numbered board, in order that the men may re-deposit the checks in the check-box on leaving the works at lunch time.

The Time-keeper will again empty the boxes, and record the checks in the Time Book, after which he will arrange the checks in numerical order on the check-board.

This process is repeated every time the workmen enter or leave the works or factory.

As we have already intimated, this method of recording time is, however, falling into disuse apart from the smaller type of concern whose activities do not justify the expense of the installation of automatic time-recorders. Unless the utmost confidence can be placed in the honesty of the time-keeper, the system is unsatisfactory to the worker and to the employer, and it is open to abuse by unscrupulous workmen. For example, it is possible for a workman to take a fellow-workman's check off the check-board by pre-arrangement, and deposit it with his own in the check-box—the fellow-workman entering the works surreptitiously at a later hour. Or a dispute might arise as to the substitution of the "late" box for the "early" box before the period of grace had expired.

A similar method to the above is that by which the workman is given four metal discs of different shapes and sizes, two of these being used for the morning and the remaining two for the afternoon. On arriving at the works in the morning at the correct time, the workman places the proper disc in a box specially prepared to receive it by means of a slit corresponding to the size of the disc. If the workman is late the second disc is placed in the late box, the first box having been previously removed at the expiration of the period of grace. This late box is constructed in such a manner that

TIME BOOK

Check No.	Name	THURSDAY					FRIDAY					SATURDAY					MONDAY					TUESDAY					WEDNESDAY					Total Hours Worked	Over-Time	Total Hours Paid
		IN	OUT	IN	OUT	TOT.	IN	OUT	IN	OUT	TOT.	IN	OUT	IN	OUT	TOT	IN	OUT	IN	OUT	TOT	IN	OUT	IN	OUT	TOT.	IN	OUT	IN	OUT	TOT.			
		a.m	p m.	p.m	p m.		a.m.	p.m.	p m	p.m.		a.m	p m.	p.m	p m		a.m	p m.	p m	p m.		a m	p m.	p m	p m		a m	p m	p m	p m				
145	W. Jackson	7.0	12.0	1.30	5.0	8½	7.30	12.0	1.0	6.0	9½	7.0	12.0	-	-	5	7.0	12.0	1.30	8.0	11½	7.0	12.0	-	-	5	7.0	12.0	1.30	6.30	10	49½	7	56½

only the "late" discs can be inserted therein; this may be effected by a smaller slit in the late box than in the normal box. The works gates are closed for a certain time after the removal of the first box and are then re-opened for a short period, thereby enabling the approximate amount of time lost by late-comers to be ascertained.

On the other hand, late discs may be dispensed with, all late-comers being noted, as regards time of arrival, by the gate-keeper or time-keeper.

Time-Recording Clock Method.

The modern method of automatically recording the time a workman enters and leaves the works, by means of automatic time-recording clocks, is becoming very popular in this country.

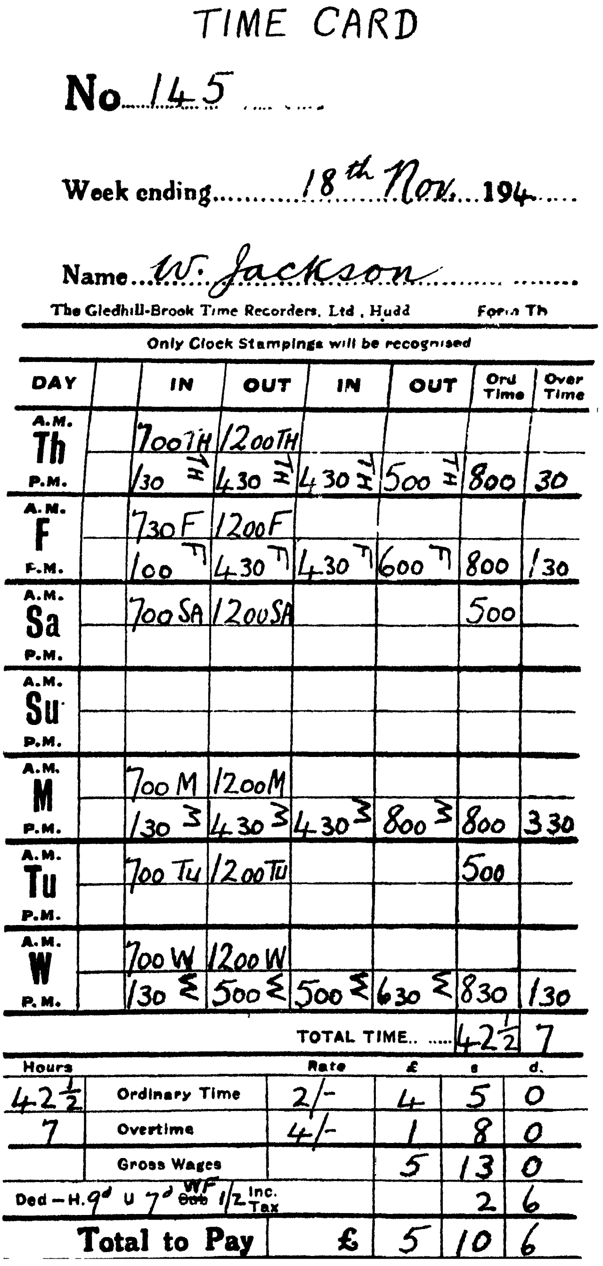
This method is a decided improvement on the aforementioned time book and metal check method, the main advantages being that:

1. A written record of the times of arrival and departure of all workmen is provided on a card, roll, or sheet; thus disputes are more unlikely as the workman is enabled to check up the actual time of his arrival or departure.
2. Fraud is minimised, particularly the possibility of one workman clocking on for a fellow-employee, for a bell usually rings each time the automatic clock is operated.
3. The preparation and compilation of wages is facilitated.

The deductions for National Insurance shown in the specimen Time Card illustrated on page 29 and subsequent documents or records are merely inserted for illustrative purposes and are not necessarily indicative of present rates or contributions.

The essential accessories of the card type of time-recorders are a special time-recording clock, two racks—one on each side of the clock; *i.e.*, an "in" and an "out" rack respectively—for the reception of the workmen's time cards.

There are various types of time-recording clocks in general use and they may be broadly classified into:



TIME CARD

No. 145

Week ending 18th Nov. 194

Name W. Jackson

The Gledhill-Brook Time Recorders, Ltd., Hudd Form Th

Only Clock Stampings will be recognised

DAY		IN	OUT	IN	OUT	Ord Time	Over Time
A.M. **Th**		700TH	1200TH				
P.M.		130 TH	430 TH	430 TH	500 TH	800	30
A.M. **F**		730F	1200F				
P.M.		100 F	430 F	430 F	600 F	800	130
A.M. **Sa**		700SA	1200SA			500	
P.M.							
A.M. **Su**							
P.M.							
A.M. **M**		700M	1200M				
P.M.		130 M	430 M	430 M	800 M	800	330
A.M. **Tu**		700 Tu	1200Tu			500	
P.M.							
A.M. **W**		700W	1200W				
P.M.		130 W	500 W	500 W	630 W	830	130
					TOTAL TIME..	42½	7

Hours		Rate	£	s	d.
42½	Ordinary Time	2/-	4	5	0
7	Overtime	4/-	1	8	0
	Gross Wages		5	13	0
Ded — H. 9d U 7d ~~Sub~~ WF 1/2 Inc. Tax				2	6
Total to Pay		£	5	10	6

(1) *Card time-recorders; and*
(2) *Miscellaneous time-recorders, which record the times on a roll or sheet inside the clock, e.g., key time-recorders and radial or dial time-recorders.*

It is proposed, in the first place, to indicate the procedure adopted in the first group; *i.e.*, the system by which the workmen's times are recorded upon separate cards.

The Time Card itself is usually ruled as shown on the previous page, although a number of alternative rulings are available.

The cards are arranged in the rack in numerical order by the Time-keeper or Time Clerk. As the workman enters the works he takes out the card bearing his number, inserts it in a slot fixed underneath the clock dial, and then presses a lever in the front of the clock, which simultaneously rings a bell and prints the time, hour and minutes, on the card, thus: 9^{06}(*i.e.,* 6 minutes past 9). He then places the card in the appropriately numbered receptacle in the card rack on the other side of the clock. The actual procedure is clearly indicated by the illustration on page 31.

When the workman leaves the works, he reverses the operation, taking the card from the rack in which it was placed on entering the works, stamping his time of leaving on the card, and then placing it in the rack from which he took it on entering the works.

An inspection of the " out " rack will reveal all absentees, while at the usual close of business an inspection of the " in " rack will reveal all employees who have not yet left the works or factory.

It is possible to arrange for the times of arrival and departure to be printed in red ink on the cards after a pre-arranged fixed time, *e.g.*, the normal times of arrival and departure, thus facilitating the calculation of wages with regard to late-comers and those employees working overtime. In some cases the clock records the day of the week in addition to the time, while in other cases it also records the date and the month.

This method, as already stated, practically eliminates all disputes as to the time the workman enters or leaves the

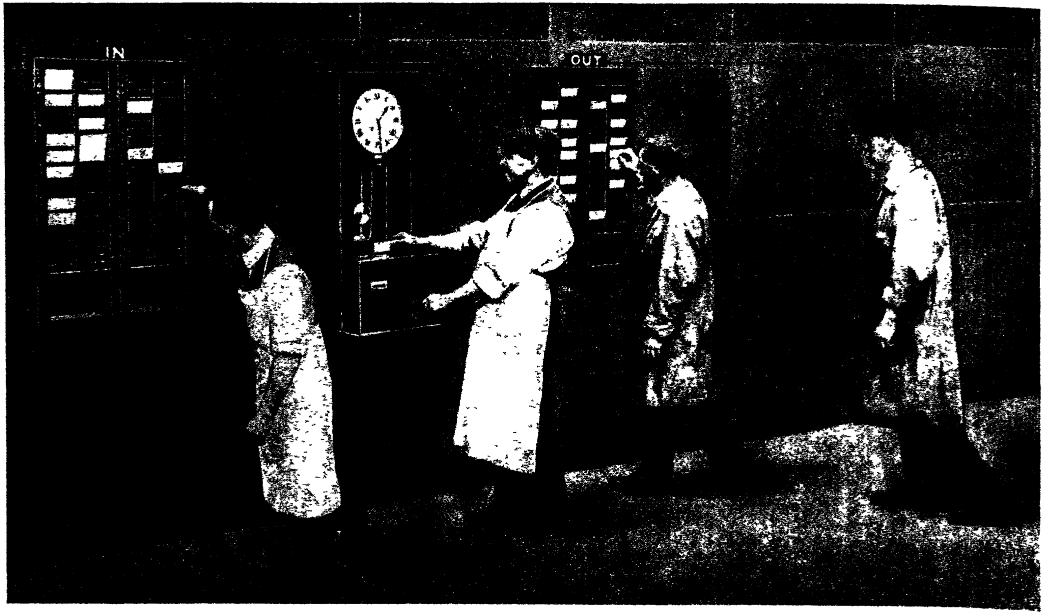


ILLUSTRATION SHOWING OPERATION OF MECHANICAL TIME-RECORDING CLOCK works, and although it might be possible for a workman to insert a "colleague's" card in addition to, though separately from, his own, such a procedure would be very risky, owing to the fact that every time the clock lever is depressed there is a distinct ring of the bell, which enables the Timekeeper to exercise a closer watch on abuses of this kind than is possible with the check system.

At the end of the week, the Time or Wages Clerk collects the cards from the rack, and substitutes a new supply for the ensuing week.

The times on the current week's cards are then totalled, and extended at the respective workmen's rates, and the information is afterwards entered on the Pay Roll, or in the Wages Book, as the case may be.

As indicated above, there are other methods available for the automatic recording of workmen's time. In every case time-recording clocks are utilised, the essential difference being in the mode of registration of the time. For example, the key method may be adopted, by which a numbered key replaces the time card, this key being inserted in a special keyhole in the clock, thereby enabling a printed impression to be made on a paper roll inside the clock of the number and the times of arrival and departure of each individual workman. Thus in this case a chronological record is available of the times of arrival and departure of workmen, from which record the time records of each workman can be compiled.

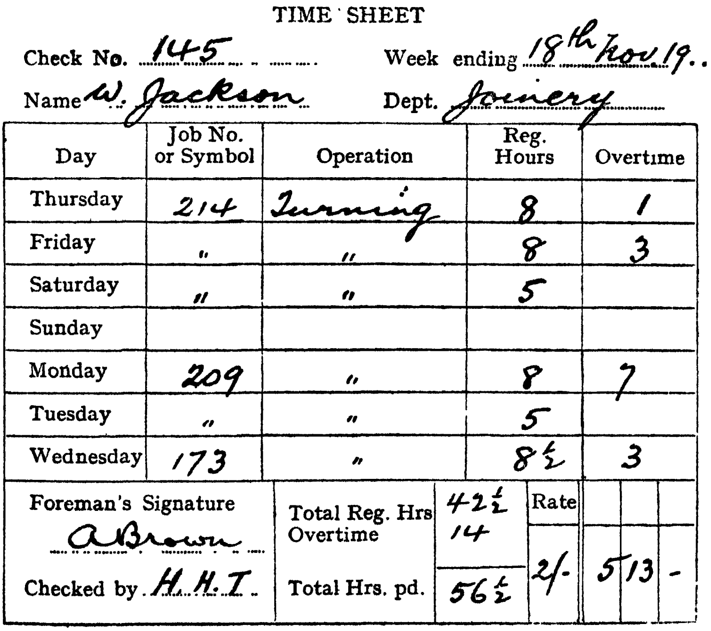
On the other hand, a further type of time-recorder may be used by which registration is effected by means of a pointer-arm, which is swung round until it reaches the workman's number on the rim of the hoop-like fitting; this pointer is then depressed, thereby recording the required details as regards time on the time sheet previously inserted in the machine which revolves in relation to the movements of the pointer.

The subject of automatic time-recorders is a fascinating one, but unfortunately it is not possible to explain the various systems in detail except in a book devoted to this and similar machines. The reader is firmly advised to extend his study of this absorbing subject by a perusal of the catalogues of the leading manufacturers of automatic time recorders; *e.g.*, the Gledhill Brook, the Dey, the International, the Blick, etc.

On the following page is an illustration of a Pay Roll, or Wages Book showing a corresponding entry to that already shown previously in the specimen Time Book on page 27.

Time Sheets.

In addition to the Time-Recording Cards, each workman is supplied with a *Time Sheet,* on which is entered day by day, by the workman, full particulars as to the nature of the work he has done, with the relative number, or numbers, of the job or contract on which he has been engaged, indicating the amount of time expended on each of such jobs.



TIME SHEET

Check No. 145 Week ending 18th Nov 19.

Name W. Jackson Dept. Joinery

Day	Job No. or Symbol	Operation	Reg. Hours	Overtime
Thursday	214	Turning	8	1
Friday	"	"	8	3
Saturday	"	"	5	
Sunday				
Monday	209	"	8	7
Tuesday	"	"	5	
Wednesday	173	"	8½	3

Foreman's Signature A Brown

Checked by H. H. T.

Total Reg. Hrs Overtime	42½ 14	Rate			
Total Hrs. pd.	56½	2/-	5	13	-

It should be noted that overtime may count as time and a quarter, time and a half, or double time, according to the

WAGES BOOK
(Pay Sheet or Pay Roll)

Week ending ——

Clock No.	Name	Weight				Hours	Rate	Gross Amount Earned	Deductions				Net Amount Paid	Employer's Insurance Contributions	
		t	c	q	lbs				Hospital	Work Fund	Health Insurance	Unempt Insurance		Health	Unempt.
145	W. Jackson					56½	2/-	5 13 -		- 1 2	- - 9	- - 7	5 10 6	- 9	- 1 -

basis adopted in each case. The total equivalent of ordinary hours is placed in the overtime column, thus 3 hours overtime at time and a half is equivalent to 3 plus $1\frac{1}{2}$; *i.e.*, $4\frac{1}{2}$ ordinary hours, this latter figure being shown on the Time Sheet. The manner in which these Time Sheets are completed is indicated by the specimen example on page 33, showing the Time Sheet corresponding to the illustration on page 29.

These Time Sheets are signed by the Foremen of the respective departments, or shops, and sent to the Wages Office. The Time Sheets are then compared with the Time-Recording Cards by the Wages Office staff, and the total number of hours agreed.

The weakness of this system of Time Sheets is that they are not usually filled up until towards the close of the week; thus it is impossible to obtain a high degree of accuracy, while in certain classes of work the sheets are liable to become creased, dirty, or oily, and hence not easily decipherable by the Cost Department.

Furthermore, where a workman is engaged on both piece work and day work, it is possible for him to manipulate the records of his time to his decided monetary advantage, by increasing the time shown for day work and correspondingly decreasing the time spent on piece work. An additional disadvantage is that "waiting" or "idle" time, *e.g.*, time lost by a workman standing idle owing to jobs not being ready, may be charged up to a job as direct labour.

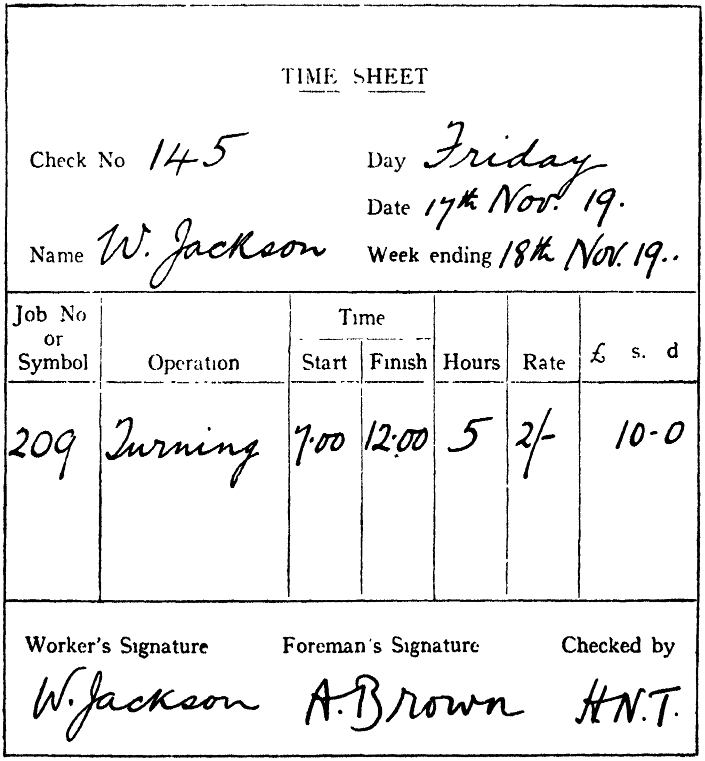
The foregoing disadvantages may be obviated or at least minimised by the use of *Daily Time Sheets* or by the use of *Job Tickets* or *Job Cards,* whereby the time devoted to each job is entered on the special sheet, ticket or card applicable to that particular job. This method ensures a more accurate record of the time expended on each job and enables the exact amount of waiting time to be ascertained. Alternatively each worker may be supplied with one Time Sheet for recording total time and a separate Job Ticket or Card for each job for recording productive time—in fact the method adopted will depend largely upon the class of work performed.

A specimen Daily Time Sheet is shown on page 36.

Wages Abstract.

The Time Sheets are then passed on to the Cost Department, where the cost clerks analyse them and write out the details in the classified order of the Job Numbers on Wages Abstract Sheets, in order to facilitate the posting to the Cost Ledger. These sheets are usually ruled as shown in the illustration on page 38, a specimen entry being inserted for purposes of clarity.

When separate Job Tickets or Cards are used for each job, the Wages Abstract Sheets can be dispensed with, the posting to the Cost Ledger being effected from the Job Tickets or Cards.



TIME SHEET

Check No 145 Day Friday

Date 17th Nov. 19.

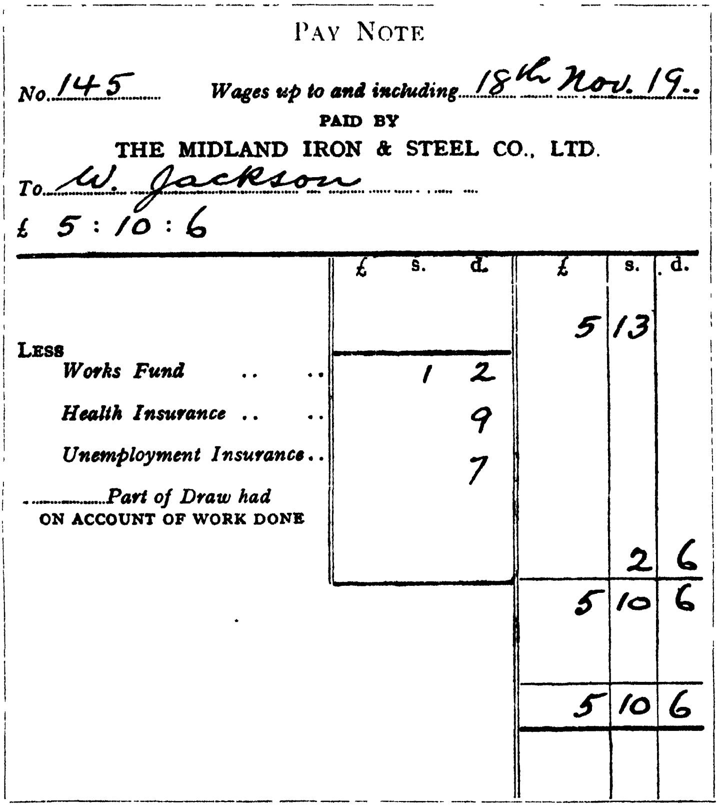
Name W. Jackson Week ending 18th Nov. 19..

Job No or Symbol	Operation	Time		Hours	Rate	£ s. d
		Start	Finish			
209	Turning	7·00	12·00	5	2/-	10-0

Worker's Signature Foreman's Signature Checked by

W. Jackson A. Brown H.N.T.

The leading authorities do not appear to be in agreement as to the treatment of special wage payments, *e.g.*, overtime, bonuses, etc., for costing purposes. Some contend that the total amount paid, irrespective of whether ordinary time or overtime, etc., should be charged to the job in respect of which it is paid. On the other hand, certain authorities suggest that such extra payments should be regarded as oncost and charged in this way to the departments concerned. In the authors' opinion both methods are correct when applied on a scientific basis; *i.e.*, all rush jobs should be charged direct with special wage payments, but where overtime, etc., is paid as a result of a surplus of work on hand, it does not appear equitable that certain jobs should be penalised if they happen to be done outside normal working hours; therefore in



PAY NOTE

No. 145 *Wages up to and including* 18th Nov. 19..

PAID BY

THE MIDLAND IRON & STEEL CO., LTD.

To W. Jackson

£ 5 : 10 : 6

	£	s.	d.	£	s.	d.
				5	13	
LESS *Works Fund*		1	2			
Health Insurance			9			
Unemployment Insurance ..			7			
..........*Part of Draw had* **ON ACCOUNT OF WORK DONE**						
					2	6
				5	10	6
				5	10	6

WAGES ABSTRACT

Week ending 18th Nov. 19..

Clock No.	Job No. 173	Clock No.	Job No. 103	Clock No	Job No. 110	Clock No	Job No. 209	Clock No.	Job No. 214	Clock No.	Job No BR/2	Clock No	Job No. PM/5	Clock No.	Job No. BE/1	SUMMARY		
																Job No. or Symbol	C L Fo	Totals
145	1 3 -					145	2 - -	145	2 10 -									

the latter case the oncost basis is more satisfactory when applied to such special wage payments. In certain classes of business that are highly seasonal, it is also equitable to charge the additional overtime payments to oncost.

In the foregoing illustration the overtime is assumed to relate to special rush jobs. The use of symbols as shown on page 33 will be explained in detail at a later stage.

Payments for time lost through air raids may be included in oncost, preferably on a departmental basis.

Preparation of Wages.

While the Wages Abstract is being prepared, the Wages Clerks may proceed to enter the details from the Time Recording, or Clock, Cards on to the Pay Roll, Wages Sheets, or Wages Book, as the case may be, from which the workmen's Pay Notes are made out. The wages are usually paid on Friday evening or Saturday afternoon in respect of the week ended on the preceding Thursday or earlier, thus giving the wages office time to prepare the Pay Roll, etc., while any premium bonus (*see* Chapter IV) is not paid until the following week in many cases.

A usual form of Pay Note is shown on page 37, which is duly completed in respect of Workman No. 145 referred to in previous illustrations. The item "Part of Draw had" indicates an instalment repayment (by means of a deduction from wages payable) of any advance made to the workman on account of the remuneration payable to him for the current or any previous week. Such advances or "subs" should only be made on presentation of an authority signed by the foreman. A deduction may be made for Income Tax (not shown in the illustration) and this refers to the proportionate amount of tax deducted by the employer in accordance with the official notification received from the Collector of Taxes.

The total of each Pay Roll, or Wages Sheet, is then entered on to a Summary Sheet, and a cheque drawn for the grand total, Cash, or Bank Account being credited and the Direct Wages Account in the Nominal Ledger (Financial) being debited.

It may be advisable to prepare the summary in sections, departmental or otherwise, the totals of each sectional summary being carried to a total summary sheet. The various summaries should be marked with a rubber stamp (as shown below) thus fixing responsibility for the actual work involved in the preparation and payment of the wages.

Wages Stamp.

Entries made by	*C.D.*
Entries checked by	*R.S.*
Extensions made by	*L.M.*
Extensions checked by	*D.F.*
Casts made by	*G.H.*
Casts checked by	*T.W.*
Wages paid out by	*B.E.*

An analysis is made of the total in order to obtain sufficient coins and notes of each denomination to facilitate the preparation of the amount to which each workman is entitled. For example, let us assume that the following hypothetical items require to be paid:

	£	s.	d.
Workman No. 145	5	10	6
,, ,, 146	1	19	5
,, ,, 149	2	11	3
,, ,, 155	3	5	8
,, ,, 156	4	11	7
,, ,, 157	3	13	9
,, ,, 160	2	6	10
,, ,, 161		19	4
	£24	18	4

It is then necessary to calculate the number of pound notes, ten shilling notes, half-crowns, two-shilling pieces, shillings, sixpences, and coppers required in order that the amount of each workman's pay may be made up exactly. For example, a payment of £2 11s. 3d. would require two pound notes, one ten shilling note, one shilling in silver, and threepence in coppers. Thus in the above hypothetical case the following notes and coins would be required from the bank:

	£	s.	d.
£1 notes (20)	20	0	0
10s. notes (6)	3	0	0
Half-crowns (8)	1	0	0
Two-shilling pieces (6)		12	0
Shillings (3)		3	0
Sixpences (3)		1	6
Coppers (22)		1	10
	£24	18	4

It should be noted, however, that it is not always possible to obtain silver to the exact denominations required, therefore the above illustration would have to be adjusted according to whether or not the required coins could be obtained.

When the total cash is received from the bank (where the total amount will have first been checked) it is divided into amounts corresponding to the totals of the separate Wages Sheets, and in accordance with the required monetary denominations. Each of these amounts is then handed to a Pay Clerk together with the corresponding Wages Sheet and Pay Notes (preferably to a clerk who was not connected with the actual making up of the particular sheet). This clerk then counts out each of the items shown on the Wages Sheet, and hands over each amount, as counted, to an assistant who checks the amount, compares it with the amount shown on the Pay Note, and, if correct, deposits cash and Pay Note in a Pay Box, Pay Tin, or Pay Envelope, which is marked with the individual workman's name and/or number.

This method of dealing with the total wages in sections facilitates the localisation of any error, should one have been made; whereas, if the separate items are counted out from the grand total, it would be almost impossible, in the case of, say, a thousand Pay Tins, to make a recount of the whole of the separate amounts in order to discover the error before the time appointed for the payment of the workmen.

In making up the wages great care should be exercised that in no circumstances should the person making up the wages be connected with the actual paying out of the wages, as this is a very likely avenue for fraud. A fundamental rule to remember with regard to wages calculations and payments is that as many members of the staff as possible should carry out the work, thus making the possibility of fraudulent collusion more difficult.

If any workers are absent when the wages are paid, the wages of such workmen should only be paid to some other person on the written authority of the absentee workmen.

The wages of outside workers should be made up in the cost office from the records supplied by the foreman in charge of the outside contract, and an official should be sent to the site of the contract to pay the workmen.

When actually paying the wages a number of firms require the workman to sign the back of his time card or to sign a voucher as an acknowledgment of the receipt of the money and the accuracy thereof.

Test Questions

A. Define (*a*) Direct Wages, (*b*) Indirect Wages, (*c*) Wages Abstract.

B. Is it absolutely necessary for workmen to record their time on entering and leaving the factory? If so, state briefly the objects of such a procedure.

C. Describe the advantages of the Time-Recording Clock system over the metal disc, or check system of recording workmen's time.

D. A proposal is being considered to install clocks for stamping the times of commencement and completion of jobs or operations; and you, as Cost Accountant, are asked for your views. What advice would you give and, if favourable, what precautions would you suggest being taken to secure reasonable accuracy in the records?

E. Describe the special features of the different types of Time-Recording Clocks known to you. In what position in the works would you propose to install them?

F. Where labour is paid according to the number of hours worked, what particulars should be shown on the Time Sheet? Explain the procedure in relation thereto.

G. From what source, or sources, is the Wages Abstract compiled? Does the Wages Abstract include "Indirect" Wages?

H. What books and forms are required in a properly organised Wages System?

J. Set out the operations up to and including the preparation of a Wages Sheet (or Pay Roll). Draw up specimen forms with typical entries.

K. Draft a specimen Pay Note, filling in name of workman, full details of pay, and usual deductions.

L. How would you ensure that no "dummy" workmen are included in the Pay Roll and how would you deal with the payment of absentee workmen.

M. Describe the system of calculating and paying wages in a factory employing 800 hands, and give the ruling of the Wages Book. A contributory Pension Fund is in operation.

N. What methods may be adopted in order to facilitate the location of errors in the counting out of workmen's wages?

O. How would you deal in the Cost Accounts with the wages of a foreman in a small engineering shop, and what variation would you suggest in the case of a "working" foreman?

P. What method would you suggest for the checking of employees' time, where such employees are part of their time employed inside the works, and part of their time on outside jobs?

Q. A manufacturer, working at high pressure, incurred considerable expenditure in overtime wages. Do you consider that the additional payments for overtime should be regarded as direct or productive wages, or should they be treated as oncost? Give your reasons.

R. In what circumstances would you propose that the bonus paid for overtime or for night shift work should be charged to:

(*a*) The particular jobs worked upon during the over time or night shift periods;

(*b*) The shop oncost expenditure; or

(*c*) General oncost expenditure?

S. What advantages result from the adoption of Daily Time Sheets or Job Tickets in place of Weekly Time Sheets?

CHAPTER IV

REMUNERATION OF WORKERS

General Considerations.

The remuneration of workers may be said to be one of the most difficult and contentious matters in the wide subject of cost accounting. From time to time the leading costing and technical authorities have endeavoured to discover a satisfactory basis of remuneration which will be acceptable to the employer and adequate for the worker, but their views are by no means unanimous. The basis of remuneration has a decided effect on the general efficiency of the factory, workshop, etc., and bears a direct relationship to the general output of production. The reader will also find that some systems, although excellent in theory, are quite unworkable in practice, thus a definite system cannot be laid down as suitable for all industries, as each individual industry (or even each unit in such industry) must be considered in direct relationship to its own particular circumstances. It is often necessary to apply more than one system to a given industry in order to provide for the differing requirements of the various classes of workers in that industry.

Methods of Remuneration.

The different methods adopted for the remuneration of workers may be divided into the following broad classes:

1. Time Work
2. Piece Work.
3. Premium Bonus.
4. Profit Sharing.

Strictly speaking, the majority of methods of remuneration are a combination of time work and piece work. Thus, if a worker is paid at a time rate, it is expected that he will at least complete a certain minimum of work during that time, whilst where a piece rate is paid it is assumed that a certain amount of work will be completed within a certain time. This latter point will be seen to be important when oncost apportioned on a time basis (*e.g.*, rent, rates, etc.) is considered in relation to the output of piece workers.

Time Work Method.

This method of remunerating workers, which is probably one of the oldest methods in existence, is also referred to as "Day Work," "Day Rate," "Time Rate," etc. By this method the worker is paid a stated sum *per day* of 8, 9 or more hours, or *per week* of forty hours and upwards in accordance with the custom prevailing in the particular industry. It should be noted that remuneration by this method does not necessarily involve the completion of any specified quantity of work, but the employer usually expects a satisfactory output to be maintained, otherwise the basic cost per unit becomes prohibitive; thus close supervision of labour is essential.

In most cases it is customary to pay extra for overtime, Sunday and holiday work, at the normal rate plus a quarter, a half or even double time.

This method of remuneration is suitable provided all workers are equal in ability and productive capacity, but in practice it is found that the efficient workmen receive no higher pay than the wholly inefficient workmen. It is usually found fairly effective when applied to general labouring, but unsatisfactory from both the employer's and workers' points of view when applied to skilled labour. When, however, highly skilled labour is used on expensive materials, it may be found that time work is preferable to piece work in that an increase in productive capacity may result in an increased percentage of spoilt materials, and thus more than offset any economy due to the increase in production.

In actual practice it is usually found that time work leads to a relatively small output, as there is no monetary incentive to the worker to obtain the maximum production, thereby resulting in increased labour costs.

The general prevalence of this system of remuneration may be attributed chiefly to its simplicity as regards calculation of wages, etc. In modern practice, however, this method is modified by the introduction of various bonus schemes, as explained later in this chapter. In fact the institution of schemes embracing a monetary incentive towards increased production has resulted in a considerable increase in production, with a consequent benefit to employer and employee.

Piece Work Methods.

ORDINARY PIECE WORK. Under this system of remuneration the worker is paid a *fixed price* for each completed operation, or for each article or series of articles produced, irrespective of the time taken by him in completing such work. Ordinary Piece Work is also referred to as "Straight Piece Work."

The results obtained from the adoption of this method are usually found to be more satisfactory to both the employer and the employee than those obtained from the Time Work method. For instance, the industrious worker is paid according to the amount of his output, thus there is a distinct tendency towards an increased output. There is also usually a decided improvement in the quality of the work performed, as the worker is paid only for work which is passed as satisfactory. The employer also benefits in a reduced general oncost, as the total output is increased and certain standing charges remain fixed, thereby resulting in a lower oncost rate.

Usually, the time taken by an average workman to complete the given operation or job forms the basis of the calculation of the fixed price for such operations or jobs, *i.e.*, the "piece rate." In other words, the worker is assessed at an hourly rate, and he is expected to produce a given article, or number of articles, or perform a certain operation in a given time. For example, if a worker is assessed at 1s. 6d. per hour, and it is estimated that he should be able to produce 50 articles in an hour, the fixed price, or rate, would be 3s. per 100. If he produced in a week of, say, 44 hours, 2,400 articles, he would receive payment at the rate of 3s. per 100, which equals £3 12s. od., or 6s. more than he would have received under the Time Work method. Thus an efficient workman is induced to accomplish more work in a given time than his inefficient co-worker, and is remunerated to a correspondingly greater extent.

The defect in this method of remuneration is that it often produces friction between employers and employees in the matter of rate fixing. The worker has no incentive to produce the maximum, owing to his fear of the rates being cut to such an extent as to compel him to work hard and continuously in order to ensure the receipt of a sum equal to the number of hours worked multiplied by his assessed hourly rate. The natural result is that the worker slows down—thus reducing production—in order to obtain a higher piecework rate. Where, however, the piece rates are fixed in an equitable manner, this method of remuneration will be found to be satisfactory in those industries where the products, etc., are capable of being divided into fixed units.

DIFFERENTIAL PIECE WORK. This method is a decided improvement on the ordinary piece work plan in that it offers an extra reward to the worker for exceptional production equal to or in excess of the average expected production. It was introduced in America some years ago by Dr. F. W. Taylor, and is, therefore, sometimes referred to as the " Taylor " system. The worker is paid on the basis of *graded rates*—one rate being paid on a specified quantity, and a higher rate for any production equal to or in excess of that fixed quantity. For example, if the rates are 1s. 10d. and 2s od. per unit, and the specified standard output is 50 units per week, a worker producing at least 50 units would be paid 2s od. per unit, whereas a worker producing less than 50 units would be paid 1s 10d per unit.

A recent modification of this method provides for a graduated scale of payment per unit, *i.e.* the rate rises as the output in the allotted time increases beyond a stated quantity—such a modification is to be found in the Merrick Differential Method.

The Differential Piece Work Method encourages the efficient worker to produce the maximum output, but unfortunately, under this improved piece work system, the fear of rate cutting still exists in the mind of the worker, with the consequent clog on production. Owing to the grading of the rates the inefficient worker would not, however, gain so much as under the ordinary piece work method, but an effort has been made to overcome this defect by means of a guaranteed day rate if the specified production is not reached. This particular method may be said to partake of the nature of a premium bonus system but it is usually classified as an improved piece work method of remuneration.

Differential Piece Work is also referred to as "Graduated Piece Work."

Balance Method. This method provides for a guaranteed hourly rate of pay in conjunction with a piece work rate per unit produced, the worker receiving the higher of his hourly earnings or piece work earnings. Thus, if the units completed are equal to or less than the remuneration due under the time work basis, he is paid at his hourly rate for the time taken, whereas if his earnings on the piece work basis exceed his earnings on the time work basis, he is paid at the piece work rate. For example, if the hourly time rates of two workers are 2s. 0d. in conjunction with a piece rate of 1s. 6d. and assuming the respective outputs in a week of 42 hours are 60 and 50 units, the first worker will receive £4 10s. 0d. (*i.e.*, 60 units at 1s. 6d.) and the second worker will receive £4 4s. 0d. (*i.e.*, 42 hours at 2s. 0d.).

Balance and Debt Method. This method operates in a similar manner to the Balance method, except that where a worker's earnings during a week on the piece work basis are less than on the time work basis, he is still paid at time rates, but the difference is carried forward to the following week(s) and deducted from any excess due to him when his piece work earnings exceed his time work earnings. Thus, in the case of the example shown above under the Balance Method, a debit balance of 9s. 0d. (*i.e.*, £4 4s. 0d. less £3 15s. 0d.—50 units at 1s. 6d.) will be carried forward against the future excess earnings of the second worker.

Contract Work. This method of remuneration is chiefly adopted in steel works, iron and steel re-rolling mills and similar industries, although strictly speaking it cannot be said to be a definite system of remuneration, as it actually amounts to a form of *sub-contracting*. The leading hand, or foreman, is given certain work at a fixed rate per ton, etc., out of which he pays his assistants and underhands. Thus actually the employer provides the material, plant, etc., and the foreman (or contractor) the necessary labour. The employer has no direct control over the general workers under this method, as their basis of remuneration is purely a matter of arrangement between them and the foreman. The tendency at the present time, however, is for the employer to pay each worker direct at tonnage or day work rates, which is certainly more satisfactory to the underhands and places the control of labour in the hands of the employer.

The contract method of remuneration is also applied extensively to outworkers.

Sliding Scale. Underlying the rates normally paid to iron and steel rollers and other steel workers is a basis fixed by the Trade Wages Boards, on which basis the rates fluctuate in accordance with the actual average selling prices of the products. These prices are generally ascertained bi-monthly.

The Sliding Scale method of remuneration was normally adopted in connection with the wages of railway workers on the basis of Board of Trade index numbers of the cost of living.

Premium Bonus Methods.

There is a large number of premium bonus methods in operation for the remuneration of workers, all based upon the sharing, in some agreed proportion, between employer and employee, of the time saved in performing a job or operation as compared with the standard time set for the job or operation. It is not possible within the scope of this work to refer to all these methods. Their ultimate aim is, however, to a certain extent, identical—the increase of production by the additional inducement offered to workers in the form of a monetary bonus. Such an increase in production will not involve a corresponding increase in fixed expenses, thus the basic labour cost per unit will tend to become less as the volume of production increases. These methods are all improvements on the piece work methods, but they are often found impracticable, particularly where they are not fixed in accordance with scientific principles.

It is proposed, in the first place, to refer to the two leading premium bonus methods—the "Halsey-Weir" and the "Rowan."

HALSEY-WEIR METHOD. Where this method is in operation a certain *standard time* is set for a job, or operation, and if the worker completes the job, or operation, in less than the fixed time, he is given a bonus of (say) 50 *per cent* of the time saved.

For example, if a worker is allowed 20 hours in which to do a job, and his rate is, say, 1s. 6d. per hour, he will receive £1 10s. (20 hours at 1s. 6d.) where the full time is taken. If, however, he completes the job in 14 hours, he will have saved 6 hours, and will therefore receive 3 hours extra pay. Thus the total amount he will be paid for the job will be calculated as follows:

	£	s.	d.
14 hours at 1s. 6d. ...	1	1	0
plus 3 hours at 1s. 6d. ..		4	6
Total	£1	5	6

It should be noted that by this method the worker is guaranteed a fixed hourly rate of pay in any circumstances if he is unable to complete the job in less than the standard time. On the other hand, he is induced to effect an economy in time, by the offer of a definite bonus based upon the total time saved. A further advantage of this method is that it is easy for the worker to understand the basis of calculation of the bonus.

ROWAN METHOD. This particular method is similar to the Halsey-Weir method as regards the fixing of a standard time for the completion of a job, but in this case the percentage of time saved is *added to the hourly rate of pay.* The percentage is based on the relation that the time saved bears to the time allowed. Taking the example shown above under the Hasley-Weir method, the time saved is 6 hours, and the time allowed is 20 hours, therefore the saving effected may be expressed as 30 per cent. of the standard time allowed. Thus by this method the worker's hourly rate for the time taken is 1s. 6d. *plus* (30 per cent. of 1s. 6d.) = 1s. 11.4d. per hour, therefore he would be paid 14 hours at 1s. 11.4d., *i.e.,* £1 7s. 4d., being 1s. 10d. more than he would receive under the Halsey-Weir method.

The Rowan method has a further advantage, and that is, whereas a worker could double his wages under the Halsey-Weir method, it is impossible for him to do so under the Rowan method. This particular advantage may be emphasised by considering three further examples: Let us again assume that the standard time allowed for a given job is 20 hours, and that worker No. 1 completed the job in 18 hours; the time saved in this case would therefore be 2 hours, which represents a percentage saving of 10 per cent., which added to the worker's hourly rate of 1s. 6d. would give a rate of 1s. 7.8d. per hour. Thus this particular worker is entitled to remuneration for 18 hours at 1s. 7.8d. per hour; *i.e.,* £1 9s. 8d.

Secondly, assuming that worker No. 2 completed a similar job in 10 hours; *i.e.,* in half the time allowed, the percentage to be added to his rate would thus be 50 per cent., making his hourly rate 2s. 3d. He is therefore entitled to remuneration for 10 hours at 2s. 3d. per hour; *i.e.,* £1 2s. 6d.

Thirdly, assuming for the purpose of illustration that worker No. 3 completed a similar job in 2 hours, thereby effecting a saving of 18 hours, or 90 per cent. of the standard time allowed, his hourly rate would amount to 2s. 10.2d.; he is therefore entitled to payment for 2 hours at 2s. 10.2d. per hour; *i.e.,* 5s. 8d.

It will be observed from the above examples that for every 10 hours of work each worker would receive approximately

TABLE SHOWING COMPARATIVE EARNINGS UNDER HALSEY-WEIR AND ROWAN PREMIUM SYSTEMS

Time allowed per Unit: 20 *hours.* *Guaranteed Hourly Rate of Pay*: 1s. 6*d.*

Hours Taken	Hours Saved	Bonus		Normal Wage			Amount of Bonus						Total Wages					
		Halsey-Weir	Rowan				Halsey-Weir			Rowan			Halsey-Weir			Rowan		
		Hours	%	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s	d.
20	Nil	Nil	Nil	1	10	0		Nil			Nil		1	10	0	1	10	0
18	2	1	10	1	7	0		1	6		2	8.4	1	8	6	1	9	8.4
14	6	3	30	1	1	0		4	6		6	3.6	1	5	6	1	7	3.6
10	10	5	50		15	0		7	6		7	6	1	2	6	1	2	6
2	18	9	90		3	0		13	6		2	8.4		16	6		5	8.4

16s. 6d., £1 2s. 6d., and £1 8s. 6d. respectively. Furthermore, it is obvious that worker No. 3 has to work nine times as rapidly as worker No. 1 and five times as rapidly as worker No. 2 in order to gain an extra 12s. and 6s. respectively, whilst worker No. 2 works only about half as fast again as worker No. 1 for an extra 6s., and a fifth as fast as No. 3 for only 6s. less.

If we were to calculate the amounts earned according to the hours worked, from 2 to 18 respectively, we should find that it is an advantage to the worker to save time to the extent of 50 per cent. of the time allowed, but beyond this point the advantage to the worker would gradually diminish. This method not only renders rate-fixing foolproof, and encourages the worker to do his best, but discourages him in any attempt to perform his work in an inefficient manner.

Assuming that the time saved is shared equally between employer and employee in the case of the Halsey-Weir system, it will be found that where the percentage saving of time is less than 50 per cent. of the standard time, the worker will receive more under the Rowan system than under the Halsey-Weir system. On the other hand, when the percentage saving exceeds 50 per cent. the worker receives a higher remuneration under the latter system than under the former. Where the percentage saving is exactly 50 per cent. of the standard time, the gain to the worker is the same under either system.

The comparative effect of the two premium bonus schemes will be apparent from the table set out on the preceding page—the figures used being identical with those in the above examples.

There are various other premium bonus systems in operation, the principal of which are briefly indicated in the following paragraphs.

EMERSON EFFICIENCY METHOD. By this method a worker is given a *certain time* in which to complete a job, or perform an operation; if he completes it in the full time allowed, he is considered to be 100 per cent. efficient, and is paid a bonus of, say, 20 per cent. If a worker takes longer than the time allowed, or specified, he is considered to be less efficient, and receives a lower percentage of bonus in accordance with a graduated scale, but no bonus is paid to a worker who takes more than 50 per cent. longer than the specified time allowed for the job. The worker's daily rate is guaranteed under this particular method.

GANTT METHOD. This method is similar to the Emerson method, there being a guaranteed daily rate, but there is no graduated scale; the worker receives his bonus only if he attains the required standard of *efficiency*, in which case the foreman would also receive a bonus. This method has a tendency to remove any friction between worker and foreman, but the Emerson plan appears to give the greater incentive towards increased production.

COST PREMIUM METHOD. This particular method is more involved, as it is based on the *saving of materials* as well as of time, and as it is difficult, if not in many cases impossible, to ascertain the exact extent to which materials are saved, it is correspondingly difficult to arrive at any practical method of application of this system. If the factor of the cost of saving of materials could be surmounted in a practical manner, the Cost Premium method would certainly have a decided advantage over the other methods, which, apart from satisfactory finish in production, deal with the mere saving of labour charges.

The usual procedure under this method is to ascertain the standard cost of a given article or job by calculating materials, labour and expenses at fixed normal prices, the bonus being based upon the extent to which the actual cost is less than the standard cost; *e.g.*, if the standard cost was £3 and the actual cost £2 10s., the saving of 10s. would be wholly or partly distributed to the workers in the form of a bonus. This bonus may be calculated and distributed in a number of ways.

PRIESTMAN METHOD. This particular premium bonus method is a *collective* system, as distinct from the *individual* systems explained above in that the bonus is distributed over a group of workers, which may include the workers in the whole factory, a single department or merely a small group of men under the supervision of a foreman. A standard of output for the works, or factory, is set, or possibly a standard for one particular department or specified part of the works. For example, assuming that the number of articles represented by the standard is 100, then if 120 articles are produced within the stipulated standard time the workers are paid a bonus of 20 per cent. on their ordinary time rates.

The Priestman method has been found to produce a very good spirit among the whole of the employees—for works and office staff alike benefit when the standard output is exceeded—and furthermore, it tends to minimise leakages and slacking. Thus the management is relieved to a considerable extent of the burden of supervision. This system is termed "team work" in America, where it works very successfully.

There are various other bonus schemes adopted in practice for the remuneration of workers, all endeavouring to increase the efficiency of the workers, to interest them in their work, and to obtain maximum production. These schemes possess many advantages when applied in certain cases, but in other cases they are not very effective owing to the particular circumstances of the concerns to which they are applied.

Miscellaneous Methods.

DISTRIBUTION OF SHARES OR STOCK IN THE COMPANY. The object of this method is to make the workers feel that they are, if only to a small extent, working for themselves, that they have something at stake in the company, and that it is to their advantage that production be as high as possible, and wastage in time and materials be eliminated, or reduced to the minimum.

Workers, however, feel that they have very little voice in the actual administration of the concern, and although they have the privilege of attending and voting at the annual meetings, the procedure at such meetings appears to be extremely formal and pre-arranged, and generally they dare not venture any criticism of the directors for fear of being penalised. This attitude has, however, been countered to some extent by giving some of the worker-shareholders seats on the directorate.

The usual procedure where this " co-partnership " method is adopted is to stipulate that all stocks and shares given to the workers should revert to the company in the event of any of such workers leaving the employ of the company, and for this reason the shares are usually held by trustees on behalf of the workers.

PROFIT SHARING PLAN. A similar plan to the above, except that the workers are not shareholders, or stockholders, is that of Profit Sharing. A certain proportion of the profits is set aside for distribution among the workers according to their length of service, behaviour, efficiency and status. As, however, only a certain selected number receive such gifts, and as such workers may, or may not, have control over other workers, the interests of the whole of the workers are divided. Furthermore, as the profit-sharers have no legal right to the profits, and one, two, or more years may elapse between the distributions, there is no definite incentive for the workers to do their utmost in the interests of the company, while even when profits are available the share of each worker may be extremely small.

This method is often opposed by Trade Unions and has not proved entirely successful in practice, as the profits are invariably affected by factors outside the control of the workers; thus they may be deprived of any additional remuneration as a result of inefficient management, etc.

HIGH WAGE PLAN. Some firms offer to the prospective workers a higher rate of pay than the standard one obtaining in the particular industry and in the particular locality; the object being to attract the most efficient and experienced workers—in fact, only such workers would be paid the highest rate—and thereby to ensure the highest grade of production that it is possible to obtain. This method is used to best advantage in assembling work on mass-production lines, e.g., motor-car manufacture, where each man performs a small operation in the assembling of a chain of articles on a moving conveyor belt. In such cases the pace set is that which can be comfortably maintained by a first-class man without undue fatigue, and the nature of the work precludes the setting of separate standards for separate operations. The output in this case is therefore fixed and hence one of the chief disadvantages of normal Time Work is overcome.

In concluding this chapter we may refer to the STINT METHOD, by which a certain fixed quantity of work or a job is allocated to the worker for the day, and on completing this work, he is free to leave the factory and go home. Such work, however, requires close supervision, otherwise it is liable to be scamped. This method is more particularly applicable in the case of motor-lorry drivers in long-distance haulage work where the lorry driver goes home after completing his journey.

Test Questions

A. Detail the various methods of remunerating labour and consider each method from the point of view of costing and its probable influence on output.

B. Classify, roughly, the workers in any industry with which you are acquainted, and state what method of remuneration you would adopt for each class. Give reasons for your answer.

C. State whether you would prefer the method of payment of wages by piece-work or on time in the following industries:
(*a*) House Building.
(*b*) Coal Mining.
(*c*) Motor-car Manufacture. Give your reasons.

D. From the point of view of Cost Accounts, discuss and compare the practice of paying wages: (*a*) on the piece-work system, (*b*) on the day-work basis; and (*c*) on the bonus or premium system.

E. In what circumstances, if any, would you advise the payment of wages on the basis of hourly rates? Give your reasons.

F. What are the objections to straight piece-work as a method of remuneration and what remedies or alternatives would you recommend?

G. Calculate the earnings of a worker under: (*a*) Rowan Premium Bonus System, (*b*) Halsey-Weir Premium Bonus System (50 per cent. to worker), from the following particulars:

> Hourly rate of wages (guaranteed) 1s. 8d.
>
> Standard time for producing 1 dozen articles is 3 hours.
>
> Actual time taken by the worker to produce 20 dozen articles is 48 hours

H. Your advice is asked as to the advantages and/or disadvantages of the following wages systems, which have been submitted to a manufacturer for the purpose of increasing the output and reducing the cost of production for the mutual benefit of both employer and employee:

> (*a*) Payment to the worker of a fixed premium of one-third of the saving for each hour saved on the standard time allowed for the performance of a job.
>
> (*b*) Payment to the worker of a premium bearing the same percentage to the wages rate as the time saved bears to the standard time allowed for the performance of the job.
>
> Illustrate your answer with a concrete example.

J. Under the Halsey-Weir and Rowan Premium Bonus Systems the employer gains by a portion of the time saved by the assiduity of the worker. Should not the worker have the benefit of the full time saved? Give reasons for your answer.

K. Give the outline of any scheme of "payment by results" with which you are familiar, and mention any disadvantages of such a scheme.

L. A rate fixer issues an instruction to A to work up 100 articles, and to B to work up 150 articles, the normal wage rate to be paid in any event, being both for A and B 2s. 6d. per hour worked. The scheduled time allotted to A is 100 hours and to B 140 hours. If the work is completed within these hours, A and B are for 100 hours and 140 hours respectively to be paid at the rate of 2s. 6d. per hour. In either case, for each working hour saved on the allotted time, A or B is to receive a bonus of 3s. 3d. per hour.

A completes his work in 96 hours, and B his in 136 hours What are the amounts payable to A and B respectively?

What percentage of increase on the normal wage of 2s. 6d. per hour do A and B respectively obtain?

What, to the employer, are the costs in time per article of the articles worked up by A and B?

M. To what type of concern would you apply a collective premium bonus method in preference to an individual premium bonus method?

N. What are the usual objections raised by workers to the Profit-Sharing method of remuneration?

O. What system of remuneration would you recommend for each of the following classes of workers?

(*a*) Semi-skilled machine workers.

(*b*) Skilled machine workers.

(*c*) Semi-skilled manual workers.

(*d*) Skilled manual workers.

Give full reasons for your answers.

P. Calculate the earnings of two workers under the Balance and Debt Method from the following particulars

Hourly rate of wages, 1s. 9d.

Piece rate per article, 2s. 0d.

Articles produced in full week of 40 hours—

First worker, 40; second worker, 32.

CHAPTER V

PRIME COST—DIRECT MATERIALS

It is advisable, at this stage, to consider the second component item of Prime Cost; viz., "Direct Materials," which comprise all materials that can be definitely allocated or charged to any particular job or contract. For example, in the case of a tailoring business the amount of cloth and linings can be definitely measured and charged to each job; *i.e.*, to each suit in this case, thus these particular items are said to represent direct materials. On the other hand, in the same business it is not usually practicable to ascertain the actual value of thread, buttons and similar items required for each particular suit; therefore such items are said to be "Indirect Materials," and are charged up in the form of oncost. Similar considerations apply in the case of polish used in cabinet-making, glue in furniture-making and thread in boot-making. The question of indirect materials will be fully explained in a later chapter.

Purchasing Department.

It should be noted that the actual purchasing of materials is not a function of the cost department, but of a particular branch of the ordinary financial department; *i.e.*, the Purchasing Department. The main functions of this department are to secure the most satisfactory materials at the best possible prices and terms of payment, and to ensure delivery of such materials as and when required. An efficient purchasing department is one of the keys to successful manufacturing. It ensures the obtaining of maximum values with the amount of capital available, and thereby enables costs to be cut to the lowest level, with a view to meeting modern trade competition.

Pricing of Materials.

It is advisable to point out here that in dealing with Materials it is not always possible to ascertain with mathematical accuracy, as in the case of Direct Wages, the cost chargeable to a given job. This is due to the fact that materials taken out of the stores cannot always definitely be priced, owing to the fluctuations in market prices of the goods purchased. A stock of bolts, for example, may not have been purchased in one lot, but may have been accumulated by purchases at varying prices. It will be obvious, therefore, that when a small quantity is extracted from the bulk, it is not always possible to say at what price that particular quantity has been purchased.

Where materials have been purchased directly, and solely for a particular job, or contract, the exact price can, of course, always be ascertained. The above points are dealt

ORDER NO. *746*

WORKS ORDER.

JOB NO. *125*

To *B. Warburton* **Date** *4th March, 19*......

Dept. *Works A*

Article *Chassis (Type A.P.)*

Description of Work to be done......................................

Construction of Chassis (Type A.P.) as per drawing No. 879.

Drawing No.	Pattern No.	Delivery Wanted by	To be Completed by	Date of Completion	Works Manager's Signature
879	—	*16th April*	*10th April*	*10th April*	*A. Barlow*

with more fully in Chapter VII under the heading of " Stores."

Financial Records of Materials Purchased.

In the first place it is proposed to deal with the recording of the purchase of materials as it affects the financial records, as distinct from its effects on the cost records.

When an order is received by the manufacturer, for a job or contract, a *Works Order* is issued similar to that shown on the opposite page.

This Works Order must be completed and retained, as it furnishes important information as regards the general nature of the job, etc. The specific information given on the Works Order is well indicated by the completed form on page 62; and calls for no further comment. The " Job Number " at the top is particularly important, and must be quoted in all references to that particular job. The main purpose of this particular form is to give a general indication of the nature of the specific job or work to be completed.

The materials required for the execution of the job are then estimated and requisioned from the stores, on prescribed forms, indicating the date by which delivery of the materials is required, thereby fixing responsibility for delay in obtaining delivery. A *Bill of Materials* (or *Materials Specification List*) may be made out in addition to the Works Order and this will detail all materials required for the completion of the job. If the required materials are not in the stores, or if the amount of materials required for the job will bring the stock of any particular material below the estimated minimum stock (or estimated ordering level), a *Purchase Requisition* is then sent to the Purchasing Department, which sends out the necessary *Purchase Order*, after having considered the prices and qualities quoted by outside suppliers.

When the materials are delivered at the works, they are received by the Goods Receiving Clerk, and then transferred to the Storekeeper. The materials are then issued to the department, or foreman, for the continuation and final completion of the job or contract.

The question of requisitions and stores will be dealt with at greater length in Chapter VII.

It is customary in practice to keep a *Goods Received Book*, in which the person receiving the goods enters a detailed record of such goods. The required particulars may be obtained from the suppliers' *Advice Notes* or *Delivery Notes*, which specify quantities delivered, etc. The goods themselves must be checked on receipt with the detailed particulars shown on the Delivery Note. In certain cases it is usual to keep the Goods Received Book in triplicate, thereby enabling details of all goods received to be sent for reference and checking purposes to both the financial and costing departments. Incidentally, this method avoids the use of different books on alternate days. If any of the goods are rejected, a note should be made in the Goods Received Book so that the personal account of the creditor can be adjusted.

The suppliers also forward *Invoices* to their customers in which are shown full details of the goods as regards quantities, prices, etc. These invoices, as and when received, are numbered and entered consecutively in the *Purchases Journal*, or *Day Book* (sometimes called the *Bought*, or *Invoice Book*), which is ruled similarly to the specimen shown on the opposite page.

It will be seen from the specimen form of Purchases Journal that the information given is very comprehensive and supplies the detailed analysis required for costing purposes. The book itself may be ruled in any manner according to the requirements of the particular business concerned. In the case of the above specimen entries it will be seen that £37 15s. refers to Direct Materials, £4 15s. 6d. to Stores, £1 5s. to Carriage, and £15 17s. 6d. to Capital Expenditure.

An alternative method of recording the invoices in the Purchases Journal is to record them at the end of the month, entering all those from one supplier together, thereby effecting an economy in the number of ledger postings, as merely the monthly totals applicable to each supplier require to be posted to the personal ledger accounts in this case.

PURCHASES JOURNAL

Inv No	Date	Name	Description	Led Fol	Details	Totals	ANALYSIS								
							Direct Materials	Stores	Direct Expenses	Carriage and Freight Inwards	Buildings		Plant		Other Anal. Cols
											New Additions	Maintence	New Extens	Maintence	
	19—														
124	Feb 4	Supplies, Ltd	1 cwt Bolts	74	1 12 6	1 12 6		1 12 6							
5	4	J Jones & Co	1 Dynamo (Type A)		37 15 -		37 15 -								
			Carriage on above	21	1 5 -	39 - -				1 5					
6	5	Macdonald & Co	1 Portable Lathe	187	15 17 6	15 17 6							15 17 6		
7	7	Supplies Ltd	24 ft Brass Tubing	74	3 3 -	3 3 -		3 3							

The Invoices are then compared with the *Delivery Notes*, and checked with the Purchase Orders. The Delivery Notes will, of course, have been certified by the Storekeeper, or Goods Receiving Clerk. Another, and perhaps better, method is to check the Invoices with the Storekeeper's Goods Received Book or Sheets in addition to the Purchase Orders.

After the prices and extensions on the invoices have been checked, and the Invoices passed for payment, they are then available for the Cost Department, for the purpose of pricing Stores Requisitions of Direct Materials, and as a guide in estimating the values of Indirect Materials. The latter is dealt with fully in Chapter VII. Trade discounts should be deducted from purchases before they are recorded in the financial or costing books, whereas cash discounts are disregarded in pricing materials as they represent a financial saving.

The work of both the financial and costing staffs, as regards the detail checking and analysis of purchase invoices, is facilitated by the use of an *Invoice Stamp.* This consists of a rubber stamp made in accordance with the requirements of the business: for example, the following is a typical specimen of such a stamp as it would appear on Invoice No. 125 shown in the preceding specimen Purchases Journal.

Invoice Stamp.

No. *125*	Goods Received Book *48*	Sanctioned for Payment *L.M.*
Checked.	Charge in Financial A/c. *D.M.*	
With Order *A.A.*	Purchase Journal Fol. *17*	
Prices *S.J.*	Charge in Cost A/c. *D.M.*	
Calculations *J.F.*	Job Number *147*	
	Cost Journal Fol. *92*	

This stamp is impressed on the face of the invoice, the required particulars being entered therein, thus indicating at a glance to which accounts, both financial and cost, the goods are to be charged. A further advantage of this method is that responsibility for the various sections of the work is readily fixed. The utility of a stamp of this description will be well grasped by a close study of the above completed specimen. The initials shown on the extreme left of the above form refer to those members of the clerical staff responsible for the checking of the invoice itself and the various other documents.

The total of the "Direct Materials" column in the Purchases Journal is posted to the debit of the Direct Materials Account in the Financial Ledger.

In the event of any goods being returned, *e.g.*, damaged or not up to sample, etc., the above procedure is reversed, the various accounts previously debited now being credited with the invoice price of the goods returned.

Goods may also be required to restore existing stocks of materials where such stocks have fallen to the estimated ordering level, or for internal requirements other than customers' orders, *e.g.*, repairs to plant and other capital assets; in both these cases an almost similar procedure is followed to that described in the preceding pages in connection with customers' orders.

The stock of materials in hand at the end of the financial accounting period should be valued at the lower of cost or current market value for the purposes of the financial accounts.

Test Questions

A. Why is it sometimes difficult to ascertain the actual amount and cost of the Direct Materials chargeable to any given job?

B. Are all the materials used in the manufacture of an article "Direct" materials? If not, give some examples of materials which you would consider as "Indirect."

C. Draft a specimen of a Works Order, and state for what purpose such a document is used.

D. What information should appear on a Purchase Requisition? Give a specimen form.

E. In checking a Purchase Invoice, from what source, or sources, does the Invoice Clerk obtain his information for verifying the accuracy of the Invoice?

F. Give a specimen ruling of a Purchases Journal, or Bought Day Book. Insert six specimen entries and explain the nature of such entries.

G. On arrival of goods at a factory, what procedure would you recommend in order to ensure accurate records of their receipt being available?

H. Is it necessary, or advantageous, to modify the usual Financial Records of Purchases of Materials for the purpose of comparing them with the Cost Records?

J. Is it advisable to permit the Storekeeper to examine and pass invoices for materials purchased? If not, what method would you recommend for the checking and passing of invoices?

K. Explain the following terms:

(*a*) Delivery Note.

(*b*) Invoice.

(*c*) Invoice Stamp.

CHAPTER VI

PRIME COST—DIRECT EXPENSES

The two most important elements in the composition of prime cost, namely, labour and materials, have been considered in the preceding chapters. There still remains the further element of *direct expenses* to be explained, before proceeding with a more detailed consideration of stores routine and oncost. It is proposed, therefore, to indicate briefly in this chapter the nature of the various items that are generally classified as *direct* or *chargeable* expenses. In this connection the reader is advised to use the term "direct" in preference to "chargeable," as these items are not chargeable in the sense of meriting an addition to the contract price, which has already been fixed.

Direct Expenses may be said to be any expenses which can be *definitely allocated* to a particular job, contract, etc.; *i.e.,* those expenses that have been specially incurred for such jobs or contracts.

Examples of Direct Expenses.

The items of expenditure which fall under this subheading are relatively few in number, and consist chiefly of the following.

1. Workmen's and foremen's travelling expenses and subsistence allowances incurred in connection with some outside constructional work, or the supervising and laying down of any plant and machinery supplied to a customer, or any similar jobs executed wholly or partially at a distance from the works.

2. The cost of hire of cranes, traction engines, or special tools and appliances required in connection with the execution of any given job or contract.

3. The cost of any special patterns and drawings required

for any particular job where such patterns, etc., are useless for any other purpose.

4. The fees of independent experts, *e.g.*, architects and surveyors, where such fees are incurred in connection with any particular job.

5. The cost of experimental work, *e.g.*, experimental and trial work on materials, in connection with any given job or contract.

6. The cost of carriage inwards on any special materials required for a job, either to the works or to the place of construction, where such carriage is not included in the price of the materials.

If a considerable length of time would be entailed in arriving at the amount of carriage incurred in connection with the materials of each individual job, as for example where an elaborate analysis of a lengthy account of a railway company would be necessary, it is then advisable to treat the cost of carriage as an indirect expense. In this way, expenditure in respect of carriage would be included with other oncost items, and allocated according to an ascertained percentage basis to the various jobs and contracts.

Ascertainment of Direct Expenses.

Particulars of the various direct expense items may be obtained from creditors' invoices, hotel receipts, etc., the particular job or contract to which the items relate being indicated on the face of the respective vouchers.

It has been previously emphasised that one of the chief underlying principles of successful costing is *analysis,* and this applies in particular to the subject matter of this chapter. An endeavour should always be made to allocate as much expenditure as possible to prime cost items, as in this way the various jobs and contracts will be debited with items of labour, materials and expenses that are directly attributable to them. Thus, wherever possible, expenses should be debited direct to specific jobs, etc., as otherwise such items will be treated as indirect expenses, and allocated, under the heading of oncost, to the various jobs on an estimated basis, thereby diminishing the general degree of accuracy of the costing records.

Test Questions

A. From what source, or sources, are particulars of Direct Expenses obtained for costing purposes?

B. State whether in your opinion Direct Expenses should be included under the heading of oncost in allocating these expenses to the various jobs. Give full reasons for your answer.

C. Mention the chief items of expenditure that may be classified as " direct " for costing purposes.

D. Explain as clearly as possible how the item of Carriage Inwards should be treated in the cost records.

E. What is the chief object in view in analysing cost expenditure?

F. Explain whether it is correct to treat the cost of special patterns and drawings as " direct " expenditure on all occasions.

G. How should the cost of experimental work be treated (*a*) if the tender sent out by the concern is accepted, and (*b*) where it is rejected?

CHAPTER VII

STORES

The materials utilised during the course of a job or contract comprise both those purchased specially for that particular job, etc., and those obtained from the general material stores of the business. The former class of materials—direct materials—has already been considered in detail in Chapter V, therefore it is proposed to devote this chapter to a consideration of the general organisation and routine of the stores department of any average concern.

The term *Stores* will in the first place require to be defined, and for our purpose it may be assumed to represent all materials utilised in connection with jobs other than those purchased specially for such jobs or those utilised for the maintenance of plant and machinery, etc. Furthermore, the expression "stores" is also used to indicate the actual section of the works in which stocks of raw and other materials are kept or stored.

Situation of Stores.

The general lay-out and organisation of the stores department of a concern is receiving more and more attention from the management on account of the importance of that particular section of the works or factory being now recognised as a very essential factor in the attainment of economical and expedient production. It is invariably found that the institution of a sound costing system results in a better and more efficient stores department, as the latter is essential to the success of the former.

As previously indicated, confusion is likely to arise owing to the use of the term "stores" as indicating both the place where the materials are kept and the actual materials themselves. It would be preferable to reserve this specific term for the materials only, and to adopt another term, such as "stores department," for the actual building where the materials are stored.

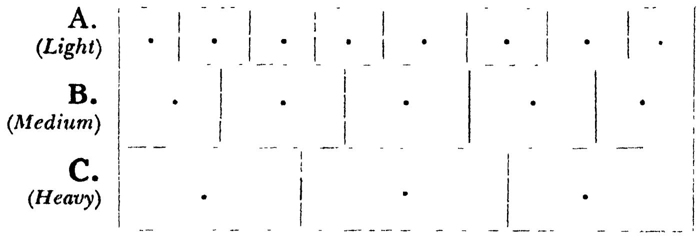
The stores department should conveniently be situated in the works in order to facilitate the reception of the materials and the distribution thereof to the various departments. For example, it is usually found advisable to have the raw materials stores and the completed stores situated near the entrance to the works so that both delivery and despatch of the goods may be assisted. On the other hand, the raw materials stores, especially if heavy or bulky, should also be as near to the manufacturing departments as possible, to save time and labour in handling. The general arrangement and lay-out of a works or factory has a considerable effect upon the efficiency of each individual department and the general harmony of the works as a whole.

Arrangement of Stores.

The stores department should be divided into sections to accommodate the different classes of materials required. For example, in an engineering stores, separate sections should be devoted to brass and copper, iron and steel, nuts, bolts and pins, etc. Similarly, where stores of raw materials are near the works entrance, sub-stores of heavy and bulky raw materials should be available near the production departments making use of such materials. Ample floor space should be provided for this department in order to facilitate easy access and transportation of stores and to avoid over-crowding and consequent confusion. Each section should be readily accessible to the chief storekeeper and his assistants. Wherever possible, the stores should be fenced off to prevent access by unauthorised persons.

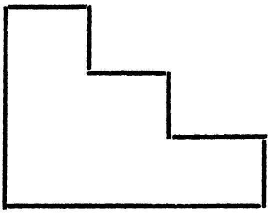
The stores accommodation must be so arranged that each particular class of stores is kept in separate *Bins* or on separate *Racks,* each of such Bins or Racks being distinctly numbered and labelled for identification purposes. Stores of liquids, *e.g.*, oils, acids, etc., should be kept in special containers, *e.g.*, metal drums or glass jars, within the appropriate bin.

These Bins should be readily interchangeable and arranged in such a manner that the heaviest articles are stored near the ground, and the lightest articles at the top, somewhat after the following plan:



the top divisions being about 5 ft. from the floor.

Where the ground floor space is restricted, the Bins can be arranged in tiers in such a manner that the top of one tier forms a platform for obtaining articles from the tier above, thus:



Bin Cards.

Each of the bins or racks should be numbered and labelled, as already stated, and a *Bin Card* should be attached to each for record purposes. On the following page is a specimen form of Bin Card duly completed.

Each Bin Card should show the reference number of the article, a description of the materials, the maximum and minimum quantities to be stocked, and full details of all receipts and issues of materials from that particular Bin. For example, in the above illustration the number of plates of that particular type must not exceed 250 and must not be allowed to fall below 75. When the number of plates in

BIN CARD

No. *75* Maximum *250*
Ordering Level *100*
Article *Transverse Plates (Type 8).* Minimum *75*

Date		Receipts		Issues				Balances
19	..	G.R.B. Fo.	Quantity	Date *19*	..	Req. No.	Quantity	Quantity
Jan.	*1*							*95*
,,	*9*	*4*	*50*					*145*
				Jan.	*10*	*148*	*30*	*115*
				,,	*12*	*153*	*12*	*103*
				,,	*19*	*169*	*47*	*56*
,,	*21*	*9*	*120*					*176*

stock is approaching the lower figure, steps should be taken to replenish the stock. If it happens that the stock falls to the ordering level of 100, a *Purchase Requisition* must be sent to the Buying Department without delay.

The Storekeeper must so replenish his stock that it does not fall below the minimum quantity, nor exceed the maximum quantity, stated on the Bin Card. In determining the maximum and minimum quantities the following factors must be taken into consideration:

(*a*) The nature of the commodity and the storage facilities;

(*b*) The frequency and average quantities of withdrawals;

(*c*) The economic ordering quantity;

(*d*) The tendency of market fluctuations in the price of the commodity; and

(*e*) The normal period required to obtain fresh supplies.

The *Ordering Level* (or *Re-ordering Level*) is not necessarily the minimum quantity for it may be at any point between the maximum and minimum quantities. The ordering level may also be recorded on the Bin Card, but, of course, it is subject to revision from time to time according to circumstances. The margin between the ordering level and the minimum stock acts as a " buffer " stock and enables the works to tide over any unusual delays in receiving the materials.

Where particular materials have been earmarked for certain jobs, an entry to that effect is made on the Bin Card, while a note should also be made on the appropriate Bin Card of any materials ordered but not yet delivered.

The Bin Cards must be kept written up to date, all receipts and issues being immediately recorded as and when such movements take place and the necessary adjustment made in the " balance " column. In this way constant checking of the quantities of stores on hand is avoided and the Storekeeper is assisted in ascertaining which particular materials require to be replaced.

In certain cases it is not usual to record all these details on the actual cards affixed to the Bins, the detailed records being entered up on corresponding cards kept in the cost office. This practice is advisable to a certain extent, as it is preferable to avoid making the Storekeeper responsible for both the actual handling of the materials and the clerical work involved in keeping the necessary records. In these cases, the Bin Cards are usually filed in a card index cabinet, the various bins being identified by numbers or symbols. In this chapter, however, it is assumed that the majority of the records are kept by the Storekeeper himself.

Receipt of Stores.

All goods delivered to the works should be received by either the Storekeeper or the Goods Receiving Clerk, irrespective of whether such goods represent " direct " or " indirect " materials. Usually an *Advice Note* is sent by the suppliers at the time of delivery, giving details of quantities, etc., of the particular goods forwarded. This Advice Note, which may accompany the goods or be forwarded separately, should not be handed to the Storekeeper, but should be passed to the Purchasing Department for record purposes. On receipt of the goods, the Storekeeper or Receiving Clerk should examine the general condition of the goods, and count or weigh them as the case may be, and make out a *Goods Received Note* in the following form:

GOODS RECEIVED NOTE

No. ....

Date Rec'd		Suppliers	Order No	Carriers	Description of Materials	Count	Meas. or Vol	Weight				Remarks on Condition of Materials
								t.	c.	q	lbs	
19 Jan	9	Priory Steel Co Ltd	137	L M S.	Transverse Plates (Type 8)	50						

Storekeeper's Signature E Roberts

He should then make an entry, recording particulars of the materials, etc., in the *Goods Received Book.* For example, the goods shown in the previous illustration, would be recorded in this book as follows:

GOODS RECEIVED BOOK

Date		Inv No	Supplier	Description of Materials	Count	Meas or Vol	Weight				Stores Led Fo.	Order No.	Remarks
							t	c	q	lbs			
19. Jan	9	115	Priory Steel Co. Ltd	Transverse Plates (Type 8)	50						27	137	

The Goods Received Note should then be sent to the Purchasing Department, where it is compared with the Advice Note, or Invoice, thus providing a check on the invoice quantities.

If it is impossible for the person receiving the goods to make a complete examination of them at the actual time of receipt, he should qualify his signature for them by adding the remark "Unexamined." In cases where the goods are delivered in a damaged condition he should qualify his signature accordingly, and a similar remark should also be made on the Goods Received Note, in order that the necessary claim may be made against the suppliers or carriers.

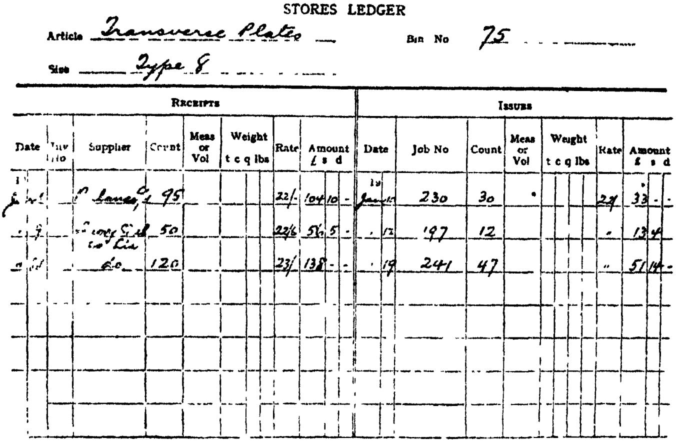
It will be found in certain cases that the making out of Goods Received Notes by the recipient of the materials is dispensed with, but this practice is to be deprecated as tending to remove the excellent check afforded on the Receiving Clerk, as in this way he is enabled to compare the Advice Note with the goods direct. For example, he might be inclined to skip his responsibilities and be tempted to take for granted the count shown on an Advice Note. On the other hand, if he has no Advice Note to which he can refer, he must count or weigh the goods in order to record the necessary particulars on the Goods Received Note. In the case of a Railway Delivery Note, the count and weight would, of course, be available for the clerk. Quantities stated on such notes should, however, always be subject to an independent check.

Where articles are made in the works in place of being purchased from outside suppliers, it is advisable to make out a form of Goods Received Note in respect of such articles when they are passed into the stores. The entry on the receipts side of the Bin Card could be made in red ink to distinguish such stores from those purchased from outside suppliers.

Stores Records.

The Storekeeper then posts the details shown in the Goods Received Book to the *Stores Ledger*, of which the following is a specimen ruling, completed in respect of the particulars shown on the Bin Card previously illustrated (page 75).

Where the stores records are compiled by the cost office, the Storekeeper being merely responsible for the receipt and issue of stores, it is usual to have two Goods Received Books for use on alternate days. Thus one book is available for the cost office while the other is retained for use by the Storekeeper and *vice versa*. On the other hand, the Goods Received Book may be provided with duplicate perforated



STORES LEDGER

Article Transverse Plates   Bin No 75

Size Type 8

Receipts								Issues						
Date	Inv No	Supplier	Count	Meas or Vol	Weight t c q lbs	Rate	Amount £ s d	Date	Job No	Count	Meas or Vol	Weight t c q lbs	Rate	Amount £ s d
19 [illegible]		Lance & Co	95			22/-	104 10 -	19 Jan 15	230	30			22/	33 - -
[illegible]		[illegible]	50			22/6	56 5 -	" 17	197	12			"	13 4
[illegible]		do	120			23/	138 - -	" 19	241	47			"	51 14 -

pages upon which carbon copies of each entry are made, thereby enabling the necessary particulars of the receipt of materials to be forwarded to the cost office for record purposes.

In order to avoid undue complications, as already stated, it is assumed for the purpose of this work that the Storekeeper himself enters up the necessary particulars in the Stores Ledger.

Where the materials are "Direct" and are speciallv ordered and immediately required for a job, they will not, of course, be placed in the Bins, but sent to the department direct, and the "issue" entered in the Stores Issued Book, from which it is posted to the Stores Ledger. Even in such a case as this the Storekeeper should require a Stores Requisition Note from the department concerned, as otherwise no record of the materials utilised will be available. Alternately, such materials can be placed in separate bins until they are required for use on the job, or retained in the ordinary bins, a note being made on the Bin Cards that they are earmarked for a particular job (see page 76).

It is advisable to point out at this stage that the Bin Cards form a *perpetual inventory* of the Stores. It is not necessary to "take stock" by counting and/or weighing the whole of the materials on hand at the end of any financial period, as was formerly the practice, for the information can readily be compiled from the Bin Cards themselves. This is now recognised as a very necessary and valuable arrangement, as the exact quantity of the stock of stores on hand can be obtained at any time, and thus the compilation of interim Trading and Profit and Loss Accounts for financial purposes is facilitated.

Stores Audit.

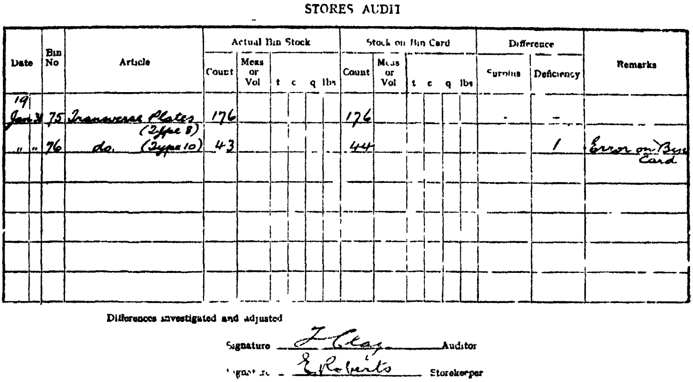
It is quite feasible that clerical errors may arise in making the necessary entries on the Bin Cards. In order to check the details shown thereon and to correct any such entries a *Stores Audit* is carried out. This audit is not absolutely essential provided that the Bin Cards are accurate in all their details, but it is highly advisable as a means of checking the work of the stores department, and also to ensure greater accuracy in the stores records. A special audit clerk is appointed to check the contents of each Bin with the "balances" as shown on the Bin Cards, and to investigate any discrepancies in quantities. The audit must be performed in such a manner that it does not interfere with the daily work of the Storekeeper, and it must be so arranged as to be completed before or at the end of the financial accounting period. Thus the stores audit clerk, often termed the *perambulating storekeeper*, should check the contents of a certain number of bins each day so that every bin is checked more than once in each financial year.

Apart from errors of a clerical nature, discrepancies are bound to occur in connection with certain classes of goods, such as grease, oil, belting, etc., where small quantities are issued from time to time from the bulk, and where it is impossible to divide up the bulk with mathematical accuracy. Similarly, discrepancies are bound to occur as a result of breakages, evaporation, pilferage, etc.

These discrepancies or losses may be divided into two classes—unavoidable losses, *e.g.*, evaporation, and avoidable losses, *e.g.*, pilferage. An efficient stores audit, however, will tend to reveal the latter and will enable the management to reduce such losses to a minimum.

A reasonable margin of difference can be fixed to cover unavoidable losses, and any loss in excess of this margin should be carefully investigated.

The records of the audit are usually shown on separate sheets, of which the following is a typical specimen :



STORES AUDIT

Date		Bin No	Article	Actual Bin Stock						Stock on Bin Card						Difference		Remarks
				Count	Meas or Vol	t	c	q	lbs	Count	Meas or Vol	t	c	q	lbs	Surplus	Deficiency	
19 Jan.	31	75	Transverse Plates (Type 8)	176						176						-	-	
"	"	76	do. (Type 10)	43						44							1	Error on Bin Card

Differences investigated and adjusted

Signature J. Clay Auditor

Signature E. Roberts Storekeeper

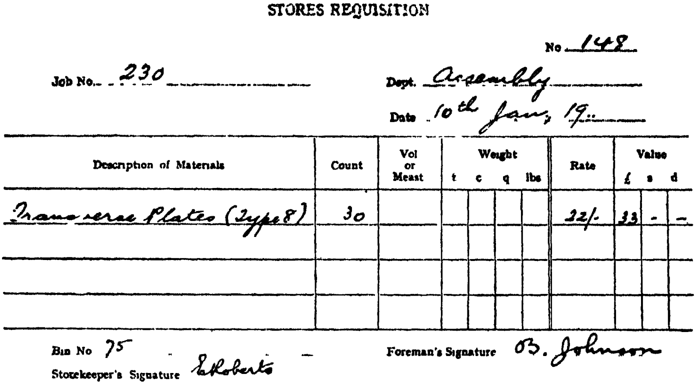
Any differences in stores, after the correction of those resulting from clerical errors, must be adjusted on the Bin Cards and the appropriate accounts in the Stores Ledger, the corresponding entry being made in a Stores Adjustment Account.

Issue of Stores.

It is essential that the Storekeeper should issue materials from Stores only against a properly authorised written request, known as a *Stores* or *Materials Requisition,* as shown in the illustration on page 82.

This requisition is usually signed by the foreman in charge of the department or job for which the goods are required, and must show details of the materials and the department or job concerned. As already stated, a Stores Requisition must be made up in respect of all materials sent direct to the department at the time of their receipt at the works.

The particulars with regard to the price and value of the goods are usually entered by the Storekeeper after he has



STORES REQUISITION

No. 148

Job No. 230

Dept. Assembly

Date 10th Jan., 19..

Description of Materials	Count	Vol or Meast	Weight				Rate	Value		
			t	c	q	lbs		£	s	d
Transverse Plates (Type 8)	30						22/-	33	-	-

Bin No 75

Storekeeper's Signature E. Roberts

Foreman's Signature B. Johnson

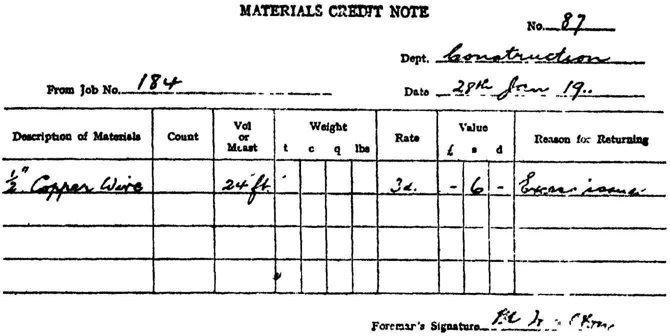
received the Stores Requisitions. A similar procedure is also adopted in connection with the Materials Credit Notes and Materials Transfer Notes referred to in the following pages.

These Requisition Notes should be numbered consecutively by the Storekeeper and the details shown thereon should be entered in the Stores Ledger and in the "Issue" column on the respective Bin Cards, after which they should be sent daily in batches to the Cost Department in order that they may be passed and the various jobs debited.

Materials Returned to the Stores.

Certain materials issued from stores for use in connection with jobs will consist of items that cannot be measured readily into the exact quantities ultimately required, *e.g.*, wire. In such cases it is usual to issue the material in bulk, a Stores Requisition for the total issue being made out, the amount in excess of requirements being returned to the stores on the completion of the job or operation. When materials are returned in this way they must be accompanied by a *Materials Credit Note,* giving full details as to quantity, weight or measurement of the materials returned.

These Credit Notes are similar in form to the Requisition Notes previously described, but are usually printed on tinted paper for distinguishing purposes. The following is a typical form in general use recording wire returned from a job as being in excess of requirements:



MATERIALS CREDIT NOTE

No. 87

Dept. Construction

From Job No. 184

Date 28th Jan 19..

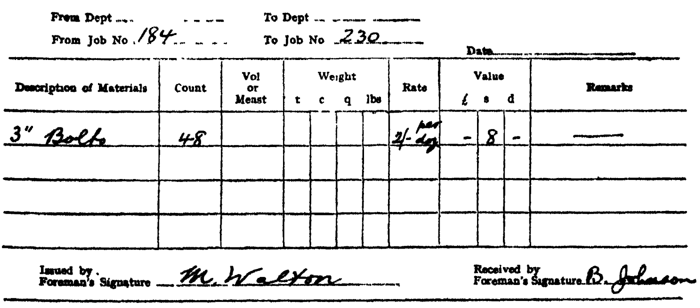
Description of Materials	Count	Vol or Meast	Weight				Rate	Value			Reason for Returning
			t	c	q	lbs		£	s	d	
½" Copper Wire		24 ft.					3d.	-	6	-	Excess issue

Foreman's Signature

The particulars shown on these Credit Notes should be recorded on the Bin Cards as representing a receipt of stores, corresponding entries being made in the Stores Ledger. They are then forwarded to the Cost Office in order that the respective jobs may be credited with all materials returned to stores.

Transfer of Materials.

Instead of returning materials in excess of the requirements of one particular job or department to the stores, it may be sometimes found more convenient to transfer them to another job or department, where this second job or department is in a position to make immediate use of them. When materials are transferred in this manner they should be accompanied by a *Materials Transfer Note*, giving full details of the materials as in the case of Credit Notes. The following is a specimen completed form of a Transfer Note:



MATERIALS TRANSFER NOTE

No. 42

From Dept ……
From Job No. 184
To Dept ……
To Job No 230
Date ……

Description of Materials	Count	Vol or Meast	Weight				Rate	Value			Remarks
			t	c	q	lbs		£	s	d	
3" Bolts	48						2/- per doz	-	8	-	——

Issued by Foreman's Signature M. Walton

Received by Foreman's Signature B. Johnson

These Transfer Notes should be sent to the Storekeeper by the job or department receiving the materials, in order that he may pass them on with the Stores Requisition Notes and Credit Notes to the Cost Department. It will not, however, be necessary for the Storekeeper to make any entry in his books relating to Transfer Notes, as the issue of materials from the Stores is not affected by the transfer of materials from one department or job to another.

As it is impossible for the costing staff to trace transfers of this nature unless a complete record is kept thereof, it is essential that a Materials Transfer Note should be lodged with the Storekeeper on every occasion when materials are transferred from the job or department to which they were originally issued.

Materials Abstract.

When the Cost Department receives the Stores Requisition, Credit and Transfer Notes, the cost clerks arrange them in accordance with the job numbers stated on them. The various classes of notes are then priced and extended, if this has not already been done by the Storekeeper, and entered on to the *Materials Abstract*, which is similar in form to the Wages Abstract mentioned in Chapter III. The example given on the opposite page shows a specimen ruling, a few entries being inserted for purposes of illustration.

It will be observed that an excellent check is afforded on the accuracy of the additions of the various columns as the cross total of the individual job and works order columns should equal the grand total of the summary column.

Only Requisitions for "Direct" materials are analysed by means of the Materials Abstract. "Indirect" materials are classified according to departments, if possible, and analysed on separate sheets for use in connection with the allocation of oncost. The Credit and Transfer Notes relating to direct materials are analysed with the Stores Requisition Notes by means of the Materials Abstract, the credits being deducted from the totals for the respective jobs, and the transfers deducted from the totals of the respective jobs for which the materials were originally supplied, and added

	MATERIALS ABSTRACT																				SUMMARY		
	Req No	Job No. 230	Req No.	Job No 231	Req No	Job No. 232	Req No.	Job No 233	Req No.	Job No.	Req Nc.	Job No	Req No	Job No	Req No.	W.O.	Req. No.	W.O.	Req. No.	W O	Job Nos.	C.L. Fo.	Net Totals £ s. d.
	148	33 - -	149	1 15 -	154	2 4 -	155	12 15 8													230	72	72 12 3
	157	18 - -	170	2 12	160	7 10 -	158	- 5 9													1	75	4 7
	171	22 - -			163	42 ·	172	- 2 3													2	76	53 19 3
					165	2 - 6															3	79	12 5 11
					167	- 4 9																	
Totals Add. Transfers	Trans No 48	73 8		4 7		53 19 3		13 3 8															
Totals Deduct. Transfers and Credits	Trans No 49	73 8 - 15 9		4 7		53 19 3	53	13 3 8 17 9															
NET TOTALS		72 12 3		4 7 -		53 19 3		12 5 11															

to the totals of the respective jobs to which the materials have been transferred.

An alternative form of Materials Abstract may be adopted

G

by which the values of materials returned to stores or transferred to another job are entered in red ink in the respective job column, such amounts being automatically deducted when the periodical totals are calculated.

Many of the Requisitions for stores may relate to materials that cannot be directly traced to any particular job or contract, and these will not, of course, be issued under any job number, but will be identified by means of a symbol. The use of symbols is explained in detail later in this chapter.

If the Storekeeper is allowed to know the prices of the materials, he may insert such prices on the Requisition Notes, etc., before sending them to the Cost Department.

The prices should not, of course, include *trade* discounts, which must always be deducted from the gross invoice price, and *cash* discounts should not be taken into account for costing purposes.

Pricing of Requisitions.

It is a fundamental rule of costing that all materials purchased specially for a job should be charged at the net invoice price plus the charge for delivery to the works.

On the other hand, the pricing of materials taken from the stores is a far more difficult matter, yet unless approximate accuracy of value is obtained, the costing results will be of little utility. This difficulty arises owing to the purchase of materials at varying prices, small quantities being issued from the bulk. Thus as it is not possible accurately to price the materials shown on the Requisition Notes, the average price of the materials purchased during the period or the average cost price of the materials in hand may be taken as a basis for costing purposes.

The market price should not be taken, as the ultimate object is to obtain as near as possible actual invoiced costs, not estimates. Furthermore, if the market prices are taken, it will be necessary to write off or adjust the consequent differences in the various accounts in the Stores Ledger, and the figures would not represent actual costs. The authors do not recommend the pricing out of stores at market prices.

The method of averaging prices is clearly indicated in the following example:

		£	s.	d.
Stock on hand (1st Jan.) (at average price for December)	10 at 3/-	1	10	0
Less Issues	7 at 3/-	1	1	0
	3 at 3/-		9	0
Add Purchases	8 at 4/-	1	12	0
do.	4 at 3/6		14	0
	15	£2	15	0

$$\text{Average price} = \frac{55}{15} = 3\text{s. } 8\text{d.}$$

Alternatively, the method of working gradually through all the purchases may be adopted, the stores being issued from the earliest lot delivered until exhausted, then from the next delivery, and so on. This method of pricing issues of materials is referred to as the "*First-in, First-out*" method. For example, if the stock consists of two purchases of 75 lbs. and 80 lbs. at prices of 2s. and 2s. 9d. per lb. respectively, the first 75 lbs. issued from stores will be priced at 2s. per lb., the next 80 lbs. at 2s. 9d. per lb., etc. This method will give very accurate results, especially where the stores issued can be recorded in the Stores Ledger (credit side) in the manner shown below, but this method is not very satisfactory when considerable fluctuations take place in market prices, as the first-in first-out principle may unduly penalise certain jobs.

STORES ISSUED

Date		Reqn No	Count.	Meast or Vol	Weight				Rate	Amount			Balances		
					t	c	q	lbs		£	s	d	Count	Meast or Vol	Weight
19	.														
Jan	20	196	30						6d		15	-			
"	24	203	60						6d	1	10	-			
"	29	207	10						6d		5	-			
			70						9d	2	12	6			

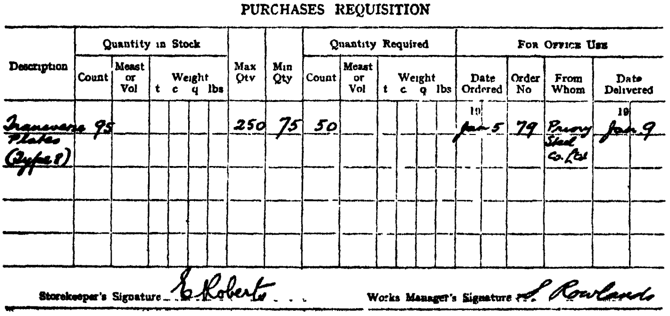
Alternatively, stores may be priced out at certain fixed prices, but this method is seldom used except where the market prices are comparatively stable and subject only to small variations.

In all the above cases the term " cost " or " price " denotes the *net* amount after deducting trade discounts, but before deducting cash discounts.

It may be remembered that it was stated in Chapter V that the stock of materials on hand at the end of an accounting period is valued at the lower of cost or current market value for the purpose of the financial accounts. Normally the corresponding stock of materials on hand is retained at cost price in the cost accounts, a fact that may be one of the sources of the discrepancy between the results shown by the two sets of accounts. This latter aspect of the subject is discussed in a later chapter. Where, however, a decided and abnormal fall has taken place in market values, the cost values of the stock in the cost accounts may be reduced to current market values, the difference being absorbed in the general works oncost or written off as a special loss.

Purchase Requisitions.

As the various stocks fall to the " minimum " quantity or ordering level, requisitions will be made out by the Storekeeper for further quantities. These requisitions are made out on prescribed forms termed *Purchase Requisitions,* and each Requisition must be signed by the Works Manager, or other responsible official. The detail recorded on these forms is illustrated below :



PURCHASES REQUISITION

Description	Quantity in Stock						Max Qty	Min Qty	Quantity Required						For Office Use			
	Count	Meast or Vol	Weight t	c	q	lbs			Count	Meast or Vol	Weight t	c	q	lbs	Date Ordered	Order No	From Whom	Date Delivered
Transverse Plates (Type 8)	95						250	75	50						19 Jan 5	79	Priory Steel Co. Ltd	19 Jan 9

Storekeeper's Signature E. Roberts

Works Manager's Signature S. Rowlands

When an order is received from a customer for a job, it will be the duty of the Order Clerk to ascertain from the Drawing Office the nature of the materials that will be required, together with the quantities, weights and measurements of such materials. If the materials are not in stock, a *Purchase Order* is sent out, after making necessary enquiries as regards terms and prices.

Sometimes the above duties, with the exception of making out the Purchase Order, are carried out by the Planning Department, or Progress Clerk.

Works Orders and Symbols.

A *Works Order* is then made out giving full details of the job or contract, the number of the job, and the date when completion is required. A form used in actual practice is shown for the purpose of indicating the amount of detail recorded on these forms, and this should be compared with the simpler form shown on page 62.

WORKS ORDER

DEPARTMENT DELIVER TO — *Order No* —
WORKS ORDER To — *Clock No* —

Drawing No	Catalogue No	Quantity of Order	PROCESS — OP SEQ NO —
Locker No	Capacity	Good from prev oper	
Excess Time Ref No			

Issue Ref	HOURS	MINS	GOOD	TO BE RECTIFIED		SCRAPPED	
Time Allowed per				Material	Operation	Material	Operation
Total Time Allowed			Date passed				
Time Taken							
Total Time Saved or Lost					Pay for		
Authorised by — Ways and Means			Short or Over Order				
Date Issued			Passed by —			Inspector	

Works Orders are also supplied for buildings, plant and machinery extensions and repairs, and for stocks of finished parts, etc.

In such cases fixed *symbols* are used, with or without numbers, for every class of work which does not comprise actual or direct work on a customer's order. For example:

PR = Plant Repairs.
BR = Building Repairs.
PM = Plant Maintenance.
PE = Plant Extensions.
BE = Building Extensions.

Where there are different departments or shops, each department would have a fixed letter allotted to it for identification purposes, which would be added to the above symbols, *e.g.*, PM/A = Plant Maintenance—Department A.

Where there are several heavy and expensive machines, engines, or lathes, etc., in use the symbol system can be applied to them in addition to the departmental symbols. In fact this method is easily adaptable to all requirements, whether simple or elaborate.

All labour and materials employed for any repair or maintenance job, or for any new constructional work, would be recorded under its proper symbol, in order that the cost may be accurately allocated.

Symbols are also used for Standing Works Orders, for finished parts, etc. For example, SWO/2 would represent Standing Works Order No. 2. Receipts and issues of finished parts are dealt with in a similar manner to the receipt and issue of stores.

These costing records are required for the purpose of giving valuable information to serve as a guide in the apportionment of oncost.

It will be observed that the materials issued from time to time by the Storekeeper may be either "Direct" or "Indirect" and that "Direct" materials under the heading of Prime Cost are not necessarily purchased specially and directly, but may be obtained from the bulk of materials already in the Stores.

General Advantages of Stores Accounts.

The principal advantages that result from an efficient system of Stores Accounts may be summarised as follows:

1. Actual stocks may be agreed constantly with the figures shown in the cost records by means of a perpetual inventory,

thus not only imposing an excellent moral check upon the Storekeeper and his assistants, but also enabling discrepancies to be investigated without undue delay.

2. The extent of normal and unavoidable losses can be ascertained and kept to a minimum, *e.g.*, loss in breaking up from bulk, evaporation, etc., while abnormal and avoidable losses are readily detected and steps taken at an early date to prevent such losses, *e.g.*, pilferage, inefficient handling of stores and general wastage of stores, etc.

3. The existence of obsolete stocks is revealed, thus steps can be taken to avoid large stocks of slow-moving materials being held.

4. A close check can be kept upon minimum stocks to obviate the possibility of production being held up as a result of the required materials being out of stock.

5. Maximum stocks are fixed and the existence of any materials in stock in excess of the required maximum is brought to the notice of the management at an early date, thus over-stocking and the consequent locking up of capital in surplus stocks is reduced to a minimum, thus releasing working capital for other purposes, and minimising losses through obsolescence and deterioration.

6. The preparation of interim and final financial accounts is facilitated by the use of a perpetual stores audit as the laborious task of physical stock-taking at the end of the accounting period is avoided.

Test Questions

A. Describe as fully as you can the situation and arrangement of the Stores Building which would, in your opinion, be most suitable for the expeditious receipt and issue of materials.

B. Where sub-stores are used in each of the several departments of a factory, what procedure would you suggest for recording the transfer of materials from the main stores to the various sub-stores?

C. Prepare a *pro forma* Stores Ledger Account with suitable rulings and details in regard to any commodity with which you are familar; giving three items inwards, three items outwards, and bringing down the balances.

D. Select a business with which you are familiar, and prepare a brief set of instructions for the guidance of the Storekeeper. Submit rulings of two only of the books or documents you recommend.

E. Describe a system that would definitely link up the Purchasing Department, Goods Receiving Department and Cost Department, giving all information for passing invoices, checking goods received and posting to Cost Accounts.

F. From what source, or sources, is a Bin Card written up? Draft a form of Bin Card with three specimen entries thereon, and explain the purpose and utility of such cards.

G. In what circumstances, if at all, would you recommend the keeping of Bin Cards in card drawers in the stores or in the cost office instead of alongside the bins or racks to which they belong?

H. Define the following and say on what basis each should be determined:

(*a*) Maximum Stock.
(*b*) Minimum Stock.
(*c*) Ordering Level.

J. What steps would you take to avoid capital lying idle in the form of obsolete stocks of materials?

K. What is the function of a Goods Received Note? Give a specimen ruling.

L. What do you understand by the term "Perpetual Inventory," and what is its function?

M. How would you proceed to deal with any discrepancies disclosed by the Stores Audit?

N. Submit rulings of any books you recommend for recording the receipt and issue of goods from store in a manufacturing business with which you are familiar. Briefly outline the duties of the Storekeeper with reference to the goods under his care.

O. What do you understand by the term "Stores Requisition"? What method would you employ to ensure that all requisitions finally reach the Cost Office?

P. What is the function of a Materials Transfer Note? In what respects, if any, does it differ from a Materials Credit Note? What objections are there to passing surplus materials from one job to another?

Q. Twenty tons of material are purchased and taken into store, and eventually used on six different contracts. State in chronological order the records in relation to this material, giving details of all forms which would be used and all entries in the cost books relating to same.

R. From what source, or sources, is the Materials Abstract constructed? Give a specimen ruling.

S. Explain the main methods of pricing issues of materials and state which of these methods is, in your opinion, the most accurate.

T. Copper is purchased at £60 a ton in January for general stock and is used in the following June when the market price has risen to £70 a ton. What figure would you use in your costs? Give reasons for your answer.

U. A manufacturing concern purchases from time to time large quantities of a commodity used in the manufacture of one of its products. The following are the details of purchases during the six months ended 30th June, 1942:

1942.	Quantity	Cost Price per 100.
		s. d
February 2	10,000	10 0
March 15	25,000	10 6
April 20	20,000	9 6
May 3	15,000	9 0
June 1	12,000	9 0
June 20	3,000	8 6

There were 15,000 units in stock at 1st January, 1942, which were valued at 9s. 6d. per 100.

Quantities issued from store during the six months were as under:

1942.	
January 25	10,000
February 28	8,000
March 29	25,000
April 30	20,000
May 15	18,000
June 29	15,000

At what prices should the issues be charged and the closing stock valued? Prepare a Stores Ledger Account illustrating your views.

V. A manufacturer uses cost price as the basis for charging out materials to jobs. The "Received" side of the Stores Ledger Account shows the following particulars:

500 Articles bought at 3s. 0d. each.
700 Articles bought at 3s. 1d. each.
400 Articles bought at 3s. 2d. each.
800 Articles bought at 3s. 1d. each.

Successive issues were made of 200, 1,100 and 200 articles.

(*a*) At what price per article (to one decimal place of pence) should each of the three issues be charged?

(*b*) Discuss briefly the general question whether materials should be charged out to jobs at cost or at market price.

W. What do you understand by the term "Symbols" and to what extent are they used in the Cost Records?

CHAPTER VIII

ONCOST (1)

Nature of Oncost.

In addition to the three elements of Prime Cost, which have been considered in the preceding chapters, there remains the question of oncost. This further element, which is an essential factor in ascertaining the Total Cost of a job or contract, may be said to comprise all expenditure on labour, materials and other services which cannot be directly charged or allocated to any particular job or contract, or even to a series of jobs or contracts.

Although, strictly speaking, all expenditure of an indirect nature could be dealt with under the single heading of "Establishment Expenses," one percentage being fixed and added to the prime cost to cover all such expenditure, it is considered more convenient to divide this type of expenditure into two main classes, viz.:

1. WORKS EXPENSES; and
2. OFFICE EXPENSES.

This division of indirect expenditure is similarly reflected in the Cost Accounts by the division of Oncost (or Overheads) into:

1. WORKS ONCOST (OR WORKS OVERHEADS); and
2. OFFICE ONCOST (or OFFICE OVERHEADS).

Office expenses or office oncost can be sub-divided into:

(*a*) Administrative;
(*b*) Selling; and
(*c*) Distributive.

Furthermore, both classes of indirect expenses or oncost may be sub-divided into:

1. *Fixed or Constant Charges, i.e.*, those items of expense that do not vary in direct ratio to the volume of production, and which are payable whether the factory is working at full capacity or not, *e.g.*, rent of factory premises, salaries of works executive, local rates, insurance of buildings and machinery, etc.

2. *Fluctuating or Variable Charges, i.e.*, those items of expense that normally tend to fluctuate according to the volume of production, *e.g.*, power charges, indirect labour and materials, etc.

In times of trade depression the distinction between fixed and variable charges is of particular importance, as a manufacturer may be forced to accept orders at a price below his normal quotation or even below his normal total cost in order to retain his trade connection with his customers. So long as the price quoted is more than sufficient to cover the prime cost and the variable oncost, the manufacturer will be able to recover some portion of his fixed oncost, and thus minimise the loss of fixed oncost.

Works Oncost.

The allocation of Oncost (or Overhead Charges, or Establishment Charges, or Expense Burden, as it is sometimes termed) cannot, from the indirect nature of its various component items, be so accurately determined and allocated as the items falling under the heading of Prime Cost.

This is obvious if such items as Timekeepers' Wages, Depreciation of Plant, Fuel, etc., are considered, as expenditure in respect of such items is incurred not solely for the benefit of one specific job or contract, but on behalf of the concern as a whole.

Although the allocation of oncost to jobs, etc., must of necessity be a matter of estimate, anything in the nature of pure guesswork must be rigorously avoided. Furthermore, it should be noted that only general rules can be laid down as to the basis of allocation of oncost, as the degree of approximation required will vary according to the particular circumstances of the business under consideration.

There are various methods of apportioning, or allocating, Works Oncost, and the nature of the particular industry under consideration is a prime factor in determining which method, or methods, is reasonably most accurate, or applicable.

In the first place, we must not lose sight of the fact that current oncost is to some extent unknown, as the exact figures are practically inaccessible. The procedure, therefore, is to ascertain from the financial books of account the total expenditure falling under the heading of Works Oncost for a previous selected period—month, quarter, six months, or year. This total is then carefully examined, and any necessary modifications are made, based upon the fluctuations, or probable fluctuations, in labour, materials, and other expenses during the current period, and the estimated output of that period. The estimated amount of fixed oncost can be ascertained without much difficulty, as this will not be affected to any material extent by the volume of production, whereas more care and scientific skill must be devoted to the determination of the probable amount of fluctuating oncost, as the amount thereof will depend mainly upon the number of units produced during the current period. Similar care is required in determining the probable output of the immediate future period, and such output should be estimated on the basis of a practically attainable standard under normal conditions of works efficiency, say, 80 to 90 per cent. of the theoretical maximum output. Having arrived at the amended total of indirect expenditure, which, though only an estimate, is a logical one, the next point to determine is the manner in which this total is to be distributed over the probable volume of output. In other words, it may be stated that the following three main factors require to be taken into account in connection with the allocation of indirect expenses to productive and other units:

(*a*) The determination of the probable expenses to be incurred in the period under review;

(*b*) The determination of the probable output for the period under review; and (*c*) The most equitable basis for the allocation of such expenses to the individual units adopted for costing purposes.

The principal methods usually adopted for the allocation of works oncost are explained in the following paragraphs, and it will be observed that the various methods can be subdivided into:

(*a*) Percentage methods of recovering works oncost; and
(*b*) Hourly methods of recovering works oncost.

The hourly methods are usually preferable to the percentage methods as a number of the works expenses vary in proportion to the time factor, *e.g.*, rent and rates.

Prime Cost Basis.

The first method proposed to be considered is that known as the Prime Cost Basis, by which the works oncost is allocated to the jobs, etc., as a percentage on the combined total of direct labour, direct materials, and direct expenses, *i.e.*, on prime cost. In order to ascertain this percentage both the prime cost of the total production and the total works expenses of a selected previous period must be ascertained, and both totals must then be adjusted to the probable expenditure on prime cost and works expenses of the period under review. The estimated works expenses are then divided by the estimated total prime cost and the result multiplied by 100, viz.:

$$\frac{\text{W.E.}}{\text{P.C.}} \times 100$$

where W.E. = Works Expenses, and P.C. = Prime Cost.

The percentage obtained in this way is added to the Prime Cost of each job undertaken during the current period, to cover the proportion of works oncost on such jobs. Thus the Works Cost of a job under this particular method, assuming Works Oncost to be 50 per cent. of Prime Cost, is ascertained as follows;

		£	s.	d.
Prime Cost of Job	=	2	10	0
Works Oncost (50 per cent.)	=	1	5	0
Works Cost	=	£3	15	0

Although the calculation of Works Oncost is comparatively simple where this particular method is adopted, it generally results in inaccurate figures of Works Costs, as works expenses usually bear no definite relationship to the combined values of direct materials, labour and expenses.

In order to illustrate the inaccuracy of this method, let us assume that it is in operation in a business manufacturing two standard articles, involving equal direct labour charges, but where an expensive metal is used in the manufacture of one article and an inexpensive metal in the case of the second article. The Works Costs of these articles would therefore be calculated as follows:

STEAM VALVES.

	Gun Metal.			*Mild Steel.*		
	£	s.	d.	£	s.	d.
Materials	1	10	0		10	0
Labour		15	0		15	0
Prime Cost	2	5	0	1	5	0
Works Oncost (50 per cent.)	1	2	6		12	6
Works Cost	£3	7	6	£1	17	6

It will be obvious that the Works Cost in one, if not in both, of the above cases is inaccurate, due to the fact that the Works Oncost has been allocated incorrectly. Apart from the cost of the raw materials, the manufacture of the gun metal valve should not absorb more expense than the manufacture of the steel valve, therefore, probably. the Works Cost of the former is over-estimated and that of the latter under-estimated.

The Prime Cost method of allocation of oncost is generally found to be fairly reliable where the products of the concern are similar, and where the direct labour is in the same ratio to the cost of direct materials for each job.

Direct Wages Basis.

This is an extremely general method of allocating works oncost to jobs, etc., and is based upon the assumption that the works expenses are incurred in connection with the direct labour only, and not in connection with the prime cost. This method is more reliable than the Prime Cost basis for labour rates are generally far more constant than prices of material, and it is also comparatively simple in its calculation.

The percentage rate is arrived at by dividing the total works expenses incurred during the selected previous period by the total direct wages for the same period, after both totals have been adjusted to the probable works expenses and direct wages of the period under review, and multiplying the result by 100. This may be expressed by the following formula:

$$\frac{\text{W.E.}}{\text{D.W.}} \times 100$$

where W.E. = Works Expenses, and D.W. = Direct Wages.

The ascertainment of Works Cost under this method is calculated as shown in the following example:

	£
Direct Materials	40
Direct Wages	70
Prime Cost	110
Works Oncost (say 50 per cent. on Direct Wages)	35
Works Cost	£145

This method is fairly satisfactory where similar articles are produced and the type of labour employed and the direct wages paid are all fairly uniform and where there is utilised little machinery involving heavy running costs.

On the other hand, this method does not provide very accurate results where skilled men are paid at varying rates, or on a premium bonus system, or where overtime is paid, as the element of time is not uniform, *i.e.*, each unit of pay does not represent a similar unit of time. Thus it is quite possible that jobs upon which highly skilled workers are employed will be over-charged and jobs upon which unskilled labour is employed will be under-charged, although unskilled labour generally involves more indirect expense in the form of supervision and wastage of materials. Similarly, jobs necessitating the payment of overtime will be overcharged, although works expenses do not increase pro rata and generally remain fairly constant whether work is performed in normal day time or in overtime.

Manual Hour Rate.

The basis of this method is the number of *direct* labour hours, and where differential rates are paid for skilled labour, the basis is obviously a truer and more scientific one than that of direct wages, because it takes into account the element of time as between a fast worker and a slow worker.

Many of the items of Works Expenses, which constitute Works Oncost, are affected largely by the factor of time, *e.g.*, such items as: Depreciation, Rent, Rates, Local Taxes, and Timekeepers' and General Labourers' Wages. Therefore, the allocation of Works Oncost on the basis of the *time* taken to accomplish a job, rather than on the *amount* of direct wages paid for such job, will give more reliable results. For example, where hourly rates vary, the amount of works expense does not necessarily fluctuate and is much the same per hour for a man on piecework producing 50 units, as for another man on time rates producing 40 units.

Under this method the allocation of the Works Oncost is ascertained by dividing the total of the works expenses for the selected previous period by the total of the net direct labour hours worked during the same period, after both totals have been adjusted to the probable works expenses and labour hours for the period under review. The result of this calculation represents the rate per hour to be applied by way of Works Oncost to each job. The formula in this case being as follows:

$$\frac{\text{W.E.}}{\text{D.L.H.}} = \text{R.}$$

where W.E. = Works Expenses, D.L.H. = Direct Labour Hours, and R. = Rate Per Hour to be charged to each job.

The following example will illustrate the application of this method:

Job No. 36.

	£
Direct Materials	50
Direct Wages	20
Prime Cost	70
Works Oncost (100 hours at 2s. per hour)	10
Works Cost	£80

(The 100 hours represents the total time taken to complete the job, and the hourly rate of 2s. is ascertained in accordance with the above formula.)

This method is fairly satisfactory when little or no expensive plant is used, otherwise there is a disadvantage in that there is a tendency to overcharge jobs performed by hand and to undercharge those jobs necessitating the use of heavy and expensive machinery. This may be overcome by fixing variable hourly rates for different classes of labour.

Machine Hour Rate.

This method is adopted where machinery is the predominant factor in production—the amount of manual labour being relatively small.

There are two methods, or means, of obtaining the rate to be applied, the respective formulae being as follows:

$$\text{(i)}\ \frac{\textit{Original cost of machinery plus estimated cost of running}}{\textit{Estimated working life of machinery in hours}} = \textit{Machine hour rate.}$$

$$\text{(ii)}\ \frac{\textit{Depreciation plus estimated cost of running for one year}}{\textit{Estimated working hours for one year}} = \textit{Machine hour rate.}$$

The latter method is advised, for it is difficult to forecast the probable effective life of a machine and the estimated cost of running the machine throughout its probable life, whereas the latter method facilitates annual revision of the machine hour rate.

The rate obtained by either of the above methods is applied in a similar manner to that illustrated above in connection with the manual hour rate, *i.e.*, by calculating the works oncost according to the number of hours the machine is engaged on productive operations.

The following example will illustrate the application of this method :

Job No. 37.

	£
Direct Materials	40
Direct Labour	15
Prime Cost	55
Works Oncost (64 hours at 2s. 6d. per hour)	8
Works Cost	£63

(The 64 hours represents the total machine time taken to complete the job, and the hourly rate of 2s. 6d. is ascertained in accordance with one of the above formulae.)

It is usually found preferable to treat the machines in groups, a machine rate being fixed for each individual group of machines, or, on the other hand, each machine may be treated separately.

The average hourly labour charge of tending the machines may also be included in the machine hour rate established for individual machines or groups of machines.

Warehousing Rate.

This method, which is also known as the "material expense" basis, is extremely difficult to calculate. It is based upon the assumption that works expenses fluctuate in direct relationship to direct materials, and is usually applied only where one particular type of unit is produced, the same amount and value of materials being consumed in each case. In other cases this method is most unsatisfactory as it over-charges those jobs using expensive materials and under-charges jobs upon which cheaper materials are used. The disadvantages of this method are therefore similar to those of the Prime Cost method already explained.

When this method is adopted the percentage rate is arrived at by dividing the total works expenses incurred during the selected previous period by the total direct materials for the same period, after both totals have been adjusted to the probable works expenses and direct materials for the period under review, and multiplying the result by 100. This may be expressed by the following formula:

$$\frac{\text{W.E.}}{\text{D.M.}} \times 100$$

where W.E. = Works Expenses and D.M. = Direct Materials.

Unit Expense Rate.

The basis of this method is to charge the expense at a rate per unit produced. It is suitable in cases where large quantities of different, yet similarly designed articles, such as garments, are produced.

Departmental Oncost.

Where there are several well-defined departments in a works or factory, a much nearer approximation to accuracy in the allocation of Works Oncost to the various jobs may be obtained by the adoption of the Departmental Basis. The total of the works expenses incurred during the selected previous period adjusted to meet the estimated conditions during the current period, must first of all be apportioned to the various departments. Each component item of the estimated works expenses must be apportioned on an equitable basis, *e.g.*, rent and rates, on the basis of the floor space of the various departments, adjusted in accordance with the situation of the department; lighting and heating, on the basis of cubic capacity or metered consumption or wattage of lamps; fire insurance, on the basis of departmental valuations adjusted to cover any special risks. The amount thus apportioned to a department is then used as the basis for that particular department alone, and the rate or percentage obtained—according to which of the previously described methods is adopted—is, of course, applied only to the jobs passing through that department.

It is not uncommon to find that many articles produced in a factory do not pass through the whole of the departments, but only through one or two of them. In these circumstances it is considered wrong in principle to allocate, or rather include in the allocation of the Works Oncost to these articles, items of oncost which have no connection with the manufacture of such articles, *e.g.*, an assembly department should not be charged with any expense relative to the use of expensive machinery.

This method naturally requires a very careful analysis of the total works expenses incurred during the period selected for the original basis. The following illustration will clearly indicate the method of analysis:

ANALYSIS OF ONCOST

ending 30th Sept. 19.

ITEMS	BASES	TOTALS			Dept 1	Dept 2	Dept 3	Service Dept
		Labour	Stores	Expenses				
		£	£	£	£	£	£	£
Indirect Labour	Wages Abstract	6,500			2,800	1,685	1,890	125
Consumable Stores	Stores Abstract		580		250	160	140	30
Rent .	Floor Space			485	143	196	125	21
Insurance (Fire)	Value			120	42	28	35	15
Depreciation (Plt and Mchy)	Plant Register Analysis			165	60	20	75	10
Gas Lighting .	Meter Readings			42	10	15	12	5
Ambulance Supplies ..	Accidents Record		16		5	4	6	1
		6,500	596	812	3,310	2,108	2,283	207
Service Dept . .	Estimated according to value of service rendered				88	44	75	207
					3,398	2,152	2,358	

The column headed "Service Department" is used for the allocation of items to the non-productive departments, as, for example, that supplying power, steam, gas, or electricity, and the total of this particular column is allocated to the various productive departments in the proportion of the services rendered by the service departments to the productive departments. Some of the service departments may supply services to other service departments, and the appropriate part of the cost of running the former departments must be allocated to the latter departments, before the balance of the cost of the former is allocated to productive departments. An analysis of the Stores Requisitions for the various departments during the selected period will provide information as to the proportion of the cost of maintenance materials to be allocated to each department.

It is highly advisable that allocations of departmental works oncost should be made at least monthly in order to keep the costing records up to date. It should be noted, however, that in order to overcome the unequal number of days in the calendar months, periods of four weeks may be taken in place of calendar months.

Office (Administrative) Oncost.

Office (or administrative) expenses which accrue in connection with the production of articles, or the execution of contracts, are usually allocated by means of an addition of a percentage on the Works Cost, the ratio being obtained from previous records covering the same period as that taken for the basis of the Works Oncost. The required percentage is obtained from the following formula:

$$\frac{\text{O.E.}}{\text{W.C.}} \times 100$$

when O.E. = Office (Administrative) Expenses, and W.C. = Works Cost.

The addition of the Office Oncost percentage to the Works Cost will then give the Cost of Production, of a given job or contract. This is illustrated by the following detailed example, in which the various elements covered by the Cost of Production are clearly indicated:

Job No. 53.

	£
Direct Materials	35
Direct Labour	15
Direct Expenses	5
Prime Cost	55
Works (or Factory) Oncost (100% of Direct Labour)	15
Works (or Factory) Cost ...	70
Office Oncost (10% of Works Cost)	7
Cost of Production	£77

A further method of obtaining an Office Oncost percentage would be to ascertain the ratio of office expenses to works expenses incurred during a selected previous period, duly adjusted to probable future conditions, but this method is seldom used in practice.

Selling and Distributive Expenses.

The items which fall under this head, such as Advertising, Travellers' Salaries and Commission, Carriage Outwards, should be separated from office or administrative expenses, otherwise the allocation of oncost for some of the jobs might be inaccurate. The treatment of these expenses is a controversial matter, as some authorities contend that they should be excluded from the cost accounts and taken into account solely for the determination of selling prices, while other authorities contend that they should be regarded as part of the cost of production. The authors favour the former theory—the exclusion of selling and distributive expenses.

The arguments in favour of the exclusion of selling and distributive expenses are apparent from a consideration of the item "Carriage and Freight Outwards." Some of the articles produced may be quoted for and delivered "At

Works," *i.e.*, at seller's works, or "F.o.r.," *i.e.*, free on rail to the nearest station to the seller's works, whilst other articles may be quoted and delivered at "C.i.f." prices, *i.e.*, prices which include cost of the goods, plus carriage to the docks, dues, porterage, freight and insurance, etc., to some foreign or colonial port. It is obvious that such expenses should not be allocated with the other items of Office Oncost uniformly to all articles produced. As a matter of fact, selling prices usually vary according to the destination of the goods, an extra provision being made to cover such distributive expenses, apart from the expenses of production.

"Advertising" may be included in the cost of production of articles on which advertising expenditure is specially incurred, but not general advertising expenditure.

"Travellers' Salaries and Commission" should also be excluded from the costs of production, as such expenditure is a factor of distribution and not of production.

As a general rule "Income Tax" is not included in the costs of production, as this item represents merely a payment to the State of a portion of the profits realised on the goods produced, and therefore bears no direct relationship to the cost of producing such goods. Such portion of Income Tax as that payable by the business upon, say, the factory manager's salary when such salary is paid "free of tax," should be included in the cost of production as an indirect works expense.

On the other hand, where it is deemed advisable to provide for the recovery of selling and distributive expenses when calculating the total cost of the output, this may be effected by charging a definite rate per article, or by charging an additional percentage on the works cost to cover expenditure of this nature. The required percentage in the latter case is obtained from the following formula:

$$\frac{\text{S.E.}}{\text{W.C.}} \times 100$$

where S.E. = Selling, etc., Expenses, and W.C. = Works Cost.

The former method (a separate rate per article) is more accurate in actual practice, as selling and distributive expenses usually bear no relation to works cost. Wherever possible it is advisable to have two separate charges for selling expenses and distributive expenses respectively, as the expenses of selling and distributing various types of articles do not usually bear any relation to one another. In some cases the selling expenses are high in proportion to the distributive expenses, while in other cases the converse applies. In any event, when a separate rate is added to the cost of production to cover these expenses, it is suggested that separate rates should be fixed for each class of article according to a careful analysis of the various selling and distributive expenses.

Test Questions

A. Define the term "Oncost." Give twelve examples of items of oncost.

B. Arrange the following items under (*a*) Works Oncost; (*b*) Office Oncost; (*c*) Selling and Distributive Expenses; (*d*) Capital Expenditure:

Works Shop Cleaning.
Ambulance Supplies.
Fire Insurance.
Factory Rates and Taxes (local).
Drawing Office Materials.
Directors' Fees.
Extensions to Fitting Shop.
Repairs to Motor Lorries.
Toolmakers' Wages.

Give reasons for your arrangement of the items.

C. Distinguish between the terms "Fixed Oncost" and "Fluctuating Oncost." Give an example of each.

D. Describe the various methods of allocating Works Oncost. Explain their respective advantages and disadvantages.

E. "Overhead Charges can only be correctly allocated by taking the time worked into account." Discuss this statement with arguments for or against other methods.

F. For what productions would you advocate the following methods of charging Oncost respectively? Give reasons.

(*a*) Percentage on direct labour.
(*b*) Percentage on direct labour plus direct materials
(*c*) Hourly labour rate.
(*d*) Machine hour rate.

G. In what circumstances should Works Oncost be distributed by the following methods?

(*a*) By a rate per ton.
(*b*) By a lump sum.
(*c*) By percentages on (1) labour, (2) materials, and (3) prime cost.

Give examples.

H. The overhead charges of a factory are allocated over the production on the "Manual Hour" basis. What do you understand this statement to mean?

A man and a boy complete similar jobs, and materials cost £10 in each case. The man spends 12 hours on the work and is paid at the rate of 1s. 8d. per hour, while the boy takes 20 hours and is paid at the rate of 1s. 0d. per hour. Oncost is charged at the rate of 2s. 6d per manual hour. Prepare a statement showing the cost in each case.

Do you approve of this method of allocating Oncost? If not, what do you suggest?

J. What do you understand by the term "Machine Hour Rate"? Illustrate your answer by an example. What effect has restricted output upon such a rate?

K. Prepare a Machine Hour Rate to cover the overhead expenses indicated below:

	Per hour.	Per annum.
Electric Power	11½d.	
Steam	10d.	
Water	1½d.	
Repairs		£53
Rent		£27
Running Hours		2,000

Original Cost Price, £1,250.
Book Value, £287.
Present Replacement Value, £1,150.
Depreciation, 7½ per cent. per annum.

L. What do you understand by the term "Departmental Oncost"? Give six items of Works Oncost, and show the basis of allocation to the various departments you would adopt in each case.

M. State briefly why it is desirable, as a general rule, to make use of different Oncost rates for each department of a manufacturing business. In what circumstances would you consider this to be unnecessary?

N. What hourly rate would be required to cover Works Oncost in a Works having three departments, the annual expenditure in connection with each being as follows:

	Dept. A.	Dept. B.	Dept. C.
	£	£	£
Indirect Stores	90	75	69
Indirect Wages	3,200	2,750	1,580
Power Service Dept. ...	980	850	730
Building Repairs	500	670	125
Plant Maintenance ...	80	70	60
Rates and Taxes (Local) .	35	25	15
Fire Insurance	15	10	8
Sundry Expenses ...	20	15	12
Ambulance Expenses ...	5	2	1

There are 12 machines in Dept. A; 10 in Dept. B; and 8 in Dept. C. The average number of hours worked weekly in all cases being 40, for a year of 50 weeks.

O. What is a "Service Department"? How may the cost of running such a department be allocated to the various production departments?

P. On what basis do you suggest that Office Oncost should be allocated to the cost of production?

Q. Are you in agreement with the contention that Selling and Distributive Expenses should be excluded from the cost accounts? Give reasons for your answer.

R. Assuming that Selling and Distributive Expenses are taken into account in ascertaining the cost of production, state the alternative bases of recovering such expenses.

S. A manufacturer finds that he can obtain orders for his products at £15 per ton, but the total cost of production is £17 10s. per ton. The total oncost included in the total cost is £6 per ton, of which £3 represents fixed charges. In what circumstances would the manufacturer be justified in accepting orders at £15 per ton?

CHAPTER IX

ONCOST (2)

Miscellaneous Oncost Items.

The object of the present chapter is to consider in detail certain of the more general items of expenditure of an indirect nature with particular reference to the manner in which such items should be treated in the allocation of Oncost.

WORKS EXPENSES

Depreciation.

Depreciation represents the loss in value of an asset due to normal and inevitable deterioration during the life of the asset, and may result from use, wear and tear, effluxion of time, etc.

It is essential that depreciation of plant and machinery, factory buildings, etc., should be provided for in the ascertainment of Works Oncost, as this particular item is an important factor in production cost. It must be remembered that depreciation is incurred irrespective of whether profits are earned or not. Depreciation should not be treated as merely an allocation of profit to be provided for in successful years and ignored in unsuccessful ones, but should be regarded as a definite charge against income.

Depreciation should not be confused with *obsolescence,* for the latter represents the sudden loss in value of an asset, *e.g.*, plant, through disuse resulting from the scrapping of the asset before the termination of its normal expected life.

From the financial point of view depreciation should be provided for by estimating the probable effective working life of the asset at the time of purchase, and by deducting or setting aside periodically (usually annually) an equal or graduated sum, sufficient to reduce the original cost of the asset to its scrap value at the expiration of its estimated life.

Although it is beyond the scope of this book to consider the various methods of providing for depreciation, a brief indication will be given of the manner in which the annual charge is calculated under the *Fixed Instalment Method.* Assuming that a particular item of plant originally costs £60, inclusive of the cost of fixing, and that it will probably perform the requisite productive functions for a period of, say, 10 years, and that at the end of such period it will be worth £5 as scrap material: thus in this case the annual charge for depreciation is ascertained by deducting the scrap value (£5) from the original cost (£60) and dividing the result by the estimated life of the asset (10 years); therefore the annual amount to be provided for is £5 10s.

This annual charge is usually expressed as a percentage of the *original cost* where the Fixed Instalment Method is adopted, or as a percentage on the *diminishing* annual value where the *Reducing Instalment Method* is adopted. The following rates of depreciation are typical of those provided in actual practice:

Motor Vehicles ...	20%—25%	on diminishing value.
General Machinery	7½%—10%	" " "
Electrical Machinery	10%—15%	,, ,, ,,
Patterns	25%—50%	on cost.

Depreciation of such items as office buildings, fixtures and fittings should be included in Office (or Administrative) Oncost, while depreciation of salesroom buildings, fixtures and fittings should be included under Selling Expenses, and depreciation of motor transport vehicles for delivery purposes should be classified under the heading of Distributive Expenses.

Plant and Patterns Registers.

Separate registers should be kept for recording detailed information respecting Buildings, Plant and Machinery, Loose Tools, and Patterns. Where the factory or works is divided into well-defined departments, separate registers should be kept in respect of each department.

Each register should show records of the initial cost of the asset, as well as particulars of all repairs, renewals and depreciation charges in connection with the asset. The information obtained from these registers will be available for both the financial and the costing records, and will be of invaluable assistance in the allocation of the Works Oncost.

The following are specimens of both a Plant Register and a Patterns Register in general use:

PLANT REGISTER

Description Portable Crane **Date Purchased** 31st March 19..
Suppliers Brown + Co. Ltd **Actual Cost** £440 — —
Department Construction **Depreciation %** 10% on cost

Date	Additions	Deprecn	Present Value	Date	Additions	Deprecn	Present Value	Repairs Date	Repairs Amount
19.. Mch 31	- - -	- - -	440 - -	19.. Dec 31	- - -	33 - -	407 - -	19 .	
19.. Jan 1	- - -	- - -	407 - -	19.. Dec 31	- - -	44 - -	363 - -	Sep 8	7 15 -

PATTERNS REGISTER

Pattern No 94 — **Date Purchased (or made)** 30th June 19..
Drawing No — **Suppliers**
Description Gear Box — Type 14 **Cost** £28 - — **Depreciation %** 15%

Date	Depreciation	Present Value	Date	Depreciation	Present Value	Date	Depreciation	Present Value
19. June 30		28 - -						
Dec 31	2 2 -	25 18 -						
19.. Dec 31	4 4 -	21 14 -						

An efficient system of plant maintenance will ensure a more even flow of production throughout the works, while breakdowns will be reduced to a minimum and the quality and quantity of the output will be improved.

Loose Tools.

The item of loose tools includes such tools as drills, dies, files, hammers, spanners, etc., as distinct from actual machine tools. It should be noted that the purchase price of such tools is not an oncost item, but that only the wear and tear suffered by such tools for the period under review should be included in the oncost calculations. This wear and tear or wastage is ascertained from a special account, known as the Loose Tools Account.

The cost of all new tools and of repairs to tools is debited to this account, and at the end of the financial period the tools in stock will be re-valued, and the Loose Tools Account credited with the amount of the valuation. This valuation figure is then brought down as the value of the stock of loose tools at the commencement of the ensuing period. The excess of the total of the debit items over the amount of the re-valuation will represent the amount of depreciation or wastage resulting from the use of such loose tools for the particular period.

The following is a specimen of a Loose Tools Account:

LOOSE TOOLS A/c

Dr. Cr.

19.. Jan	1	To Balance . . .	b/f	925	10	6	19.. Dec	31	By Stock on Hand (valuation)	c/d	1019	10	-
Mch.	3	.. Materials		150	15	-	"	"	" Depreciation . ..		202	5	-
"	10	" Wages . . .		40	9	6							
June	15	.. Cash		31	10	-							
Oct.	27	" Materials .		62	17	6							
..	30	.. Wages . . .		10	12	6							
			£	1221	15	-				£	1221	15	-
19.. Jan.	1	To Balance .. .	b/d	1019	10	-							

In the above example the amount to be included in the current oncost calculations in respect of loose tools is £202 5s.

If, however, tools are specially purchased for a job or contract they should not be debited to the above account, but should be charged direct to the particular job or contract, while any scrap value should be credited to the job concerned. When repeat orders are expected the original job should bear only a reasonable portion of the total cost of the tools based upon the anticipated number of repeat orders.

Defective Products.

Work of a defective nature, *i.e.*, inferior in quality to the standard product, may arise as a result of defects in material, faulty or inefficient workmanship, or inaccuracies in design.

If the defects in the articles produced, or partially produced, are due to faulty material, accident, or carelessness on the part of the workman, the value of the defective article—actual cost of material and labour—must be included in the Works Oncost. Where the works has well-defined departments, the defective work of each department must be charged in the form of oncost to the department in which it arises.

If, however, the defects are due to the peculiarities and difficulties of a special article, or group of articles, then the cost of the defective article must be added directly to the cost of the job or group of jobs. A similar method of treatment should be applied to defective work as the result of experiments in relation to any special article or group of articles.

Scrap and Swarf.

The selling value of scrap and swarf should be *deducted* from the Works Oncost. Where the Departmental Oncost method is adopted, the value of the scrap and swarf accruing in each department should, of course, be deducted from that particular department's allocation of Works Oncost.

In cases where the jobs are of huge dimensions, and it is practicable to collect and weigh the scrap and swarf accruing on each job, then the value thereof should be deducted directly from the cost of the job to which it relates.

Patterns, Templates, Moulds, etc.

For large patterns, or groups of small patterns, moulds, etc., a Patterns Register should be kept, as explained earlier in this chapter, and only the annual depreciation of such items should be included in the Works Oncost and the initial cost of the patterns should be capitalised.

Where, however, special patterns are made or purchased for a particular job, and where such patterns can only be utilised in connection with that particular job, and will be of no further use, the total cost thereof should, of course, be charged directly to the job.

Experiments.

In some factories a special shop is provided for the purpose of making experiments. A separate costing system will be provided for this particular department, and the cost of experiments in connection with a particular job, or jobs, should be charged direct to the job, or jobs, concerned.

Where the experiments are carried out for the improvement of the general output of the factory, the cost should be included in the total Works Oncost, or where practicable apportioned to the various departments.

Idle and Waiting Time.

Separate records should be kept of idle and waiting time, the necessary particulars being obtained from the workmen's time cards. To facilitate the analysis of such items, standard symbols should be used on the original records with a view to distinguishing between productive and non-productive time.

Similarly, a distinction should be made between normal idle time, *e.g.*, the time taken in getting to and from the factory gates to the department in which the worker is engaged and the time between the completion of one job and the commencement of the next, and abnormal idle time, *e.g.*, time lost through the breakdown of machines or the non-availability of materials when required.

Packing Materials.

Generally, packing materials are an essential part of total costs, as goods are useless in the majority of cases unless they are packed and delivered to the customer. The nature of the product must be borne in mind in determining whether or not the cost of packing it shall be treated as a works or distributive expense. Thus, where the package forms an essential container for the product, *e.g.*, the jar in which jam is sold, its cost forms part of the prime cost of the product, whereas when the package merely serves as a container for the product during transport, *e.g.*, the cartons or cases in which the jars of jam are packed, its cost will form part of the distributive expenses.

New Buildings, Plant and Machinery.

The initial cost of any new buildings, plant or machinery will not affect the cost records in any way, but the amount of repairs, renewals and depreciation which will arise in due course should be included in the Works Oncost. Where the concern is divided into well-defined departments, the amount included in Works Oncost under this heading should be divided between the various departments on the basis of area occupied, etc.

In order to arrive at a true comparative cost a charge should be made in the cost accounts, in lieu of rent, where the premises are owned by the proprietor of the business, the amount taken into account may be based upon the net Schedule A assessment for Income Tax purposes.

Maintenance Materials.

A separate analysis of maintenance materials, such as belting, cotton waste, soap, oils, bar iron, etc., should be made from the Stores Requisitions, from which analysis a reliable guide will be obtained when apportioning this item of expenditure to the various departments. If such an analysis is not possible, the whole amount of maintenance expenditure should be included in the general Works Oncost.

Outside Staffs.

Where workmen are engaged temporarily or permanently on work outside the factory, only that portion of Works Oncost which is correctly chargeable to such work should be included in the oncost. For example, all expenditure in connection with internal plant and machinery should be excluded.

OFFICE EXPENSES

Drawing Office Expenses and Materials.

These should be dealt with in a similar manner to that adopted in connection with " Experiments " as explained previously in this chapter.

Where drawing office expenses are incurred in connection with unaccepted estimates and tenders they should be included in Office Oncost as Selling Expenses, whereas if they are incurred in connection with actual orders received they should be included in Works Oncost.

Interest.

The question as to whether interest should be included in the cost of production is one upon which the leading authorities differ, but the majority appear to favour the exclusion of " interest on capital " from the cost accounts.

Those in favour of the inclusion of interest in the cost accounts contend that interest actually represents the remuneration of capital in a similar manner to which wages represent the remuneration of labour, and should therefore be treated as part of the cost of production. On the other hand, those authorities who oppose the inclusion of interest argue that interest is profit and should be disregarded in the cost accounts. Furthermore, uncertainty may arise in the interpretation of the term " capital," while the rate of interest will tend to fluctuate except when it relates to actual borrowed capital.

In the authors' opinion, interest should not be considered as an item in the cost of production, except in special circumstances. For example, the interest on the sums sunk in the purchase of plant and machinery and buildings should be taken into account in order to facilitate comparisons between methods of production. Similarly, interest on capital invested in material stocks should be included, as, for example, where capital moneys are tied up in stocks which require to be held for lengthy periods in order that they may properly mature, *e.g.*, wines, tobaccos, timber, etc.

Interest on borrowed money, *e.g.*, debenture interest, should, however, be excluded from the cost accounts, as such interest relates to the financial accounts rather than to costs of production. The inclusion of interest of this nature would tend to vitiate the results for estimating purposes, and the difficulty would be increased by the prevalent fluctuating rates of interest on borrowed money. On the other hand, it may be contended that interest on money borrowed to assist the completion of a specific job or contract should be charged as an item of expense to that particular job or contract.

Oncost on Work-in-Progress.

At the termination of each financial period, there will invariably be certain jobs not yet completed, and the value of such jobs must be included in both the financial and the cost accounts.

In the cost records only Prime Cost entries of such work will have been made, but it is obvious that the work already performed on these jobs will have absorbed a certain amount of oncost expenditure. Oncost, however, is not debited to the jobs until they are completed, as it is generally the completed Prime Cost figures, or the time taken for the completion of the jobs, which form the basis for the application of the oncost allocation.

The method adopted in the cost records to provide for accrued oncost on uncompleted jobs is to credit Works Oncost Account and Office Oncost Account with the respective amounts accrued, and to debit a Works Oncost Suspense Account and an Office Oncost Suspense Account respectively with similar amounts. The debits to the Oncost Suspense Accounts, plus the total of the Prime Cost entries relating to the uncompleted jobs, represent the amount or value of the Work-in-Progress at that particular date. A practical illustration of this particular method of treatment of oncost will be found in the next chapter.

Test Questions

A. Distinguish between " Depreciation " and " Obsolescence ", and state how each should be provided for in the calculation of cost.

B. A manufacturer installed a machine in January 1934, costing £1,000, the estimated life of which was 20 years, and the residual value at the end of that time was estimated at £25. State the rate at which you consider depreciation should be calculated.

In October 1942, the manufacturer purchased a new and improved model for £1,100, and discarded the old machine, which he sold for £200.

Write up the Plant Register at the end of 1942, so far as the machine purchased in 1934 is concerned, making the necessary annual entries on the basis you recommend and state how you would deal in the financial accounts with any balance standing after the sale has been completed in 1942. Further, how should this balance be treated, if at all, in the Cost Accounts of the business?

C. Draft a specimen ruling for a Plant Register, and state the advantages derived from the use of such a register.

D. How should Loose Tools be treated in the Cost Accounts?

E. How would you deal with Defective Work and Scrap in the Cost Records?

F. Distinguish between " normal " idle time and " abnormal " idle time. Describe how you would measure the item of idle time and how you would deal with the same in the Cost Accounts.

G. How would you treat the expenditure incurred in connection with the following items in the Cost Accounts?

Packing Materials.
National Insurance (Employers' contributions).
Salaries of Canteen Staff.
Repairs to Roads in Works.
Interest on Loan.
Advertising Expenses.
Fire Insurance Premiums.
Carriage Charges.
Salesmen's Commissions.
Income Tax.

H. How would you deal with the following items in the Cost Accounts?

(*a*) Material damaged in course of manufacture.
(*b*) Idle time of expensive machinery irregularly used.
(*c*) Expenditure in connection with a research department.

J. Briefly state the arguments for and against the inclusion of interest on capital as an element in the cost of production, and discuss circumstances and cases in which the inclusion of such interest is (*a*) desirable and (*b*) not desirable. Give reasons for your answer.

K. Should "Oncost" be added to Work-in-Progress prime cost values? Give reasons for your answer.

L. The cost of goods sold should include all expenses to place the product in a condition and position to sell. Enumerate the various classes of expenditure involved and state whether you consider packing expenses should be included as a direct or an indirect charge. Give reasons for your conclusions.

CHAPTER X

COST BOOKS AND ACCOUNTS

It is essential that proper books of account should be kept for costing purposes in order to maintain a complete and systematic record of the progress of the various jobs and contracts. These books should be kept on the ordinary double entry principle, thereby enabling a check to be maintained on the accuracy of the various records and facilitating the reconciliation or agreement of the cost accounts with the financial accounts. It is assumed that the reader possesses a knowledge of the fundamental principle of double entry book-keeping by which every debit entry is represented by a corresponding credit entry, and will therefore comprehend the application of this principle to the cost accounts.

It is again emphasised that no single system of costing can be prescribed for every business, as the records required will depend upon the special features of the individual business under review. The system outlined in this chapter is based upon Job Costing and is suitable for the smaller type of builder and contractor.

In addition to the Registers and Record Forms already explained in the previous chapters, the following books will be required for costing purposes:

1. JOURNAL (optional);
2. JOB COST LEDGER; and
3. GENERAL COST LEDGER.

The Job Cost Ledger and the General Cost Ledger are approximately equivalent to the Sales Ledger and Nominal (or Private) Ledger in the financial books.

The Cost Journal.

It will be noted that the use of the Journal for costing purposes is said to be optional, and in practice this particular book is dispensed with in certain cases. The various elements in the prime cost of a job or contract may be posted direct to the Cost Ledger from the original records.

For example, expenditure on Direct Materials and Direct Stores is posted direct from the Materials Abstracts—the Job Accounts being debited and Direct Materials Account being credited. Direct Wages may also be posted direct from the Wages Abstracts—Job Accounts being debited and Direct Wages Account being credited.

On the other hand, it is argued that no entry should be made in the Cost Ledger unless a definite record thereof appears in a book of original entry. This contention is in accordance with one of the fundamental rules of the double entry system, and in the authors' opinion should be applied to cost accounting in a similar manner to that in which it is applied to the general financial accounts of a business. The use of a Cost Journal in this way furnishes a more permanent record of the original data than is provided by posting direct to the Cost Ledger from numerous loose sheets.

The Cost Journal is exactly similar in general form to the principal Journal used for commercial accounting with which the reader will no doubt be familiar. Where a Cost Journal is utilised, economy in time and labour may be effected by grouping similar items in the form of compound journal entries in the following manner:

		£	s.	d.	£	s.	d.
Sundries	*Dr.*						
To Direct Wages	...				24	16	10
Job No. 26	...	4	10	9			
" 38	...	5	15	3			
" 42	...	3	19	8			
" 56	...	10	11	2			

		£	s.	d.	£	s.	d.
Sundries	*Dr.*						
To Direct Materials	...				12	13	3
Job. No. 38	..	3	10	0			
„ 39	...		10	6			
„ 74	...	1	19	7			
„ 91	...	6	13	2			

Separate Journals may be used in the Cost Accounts in a similar manner to the financial accounts in order to effect an economy in clerical labour, *e.g.*, separate Journals can be used for Direct Wages, Direct Materials, Works Oncost and Office Oncost.

Job Cost Ledger.

The Cost Ledger, in which a record of the various jobs or contracts is kept, is specially ruled so that the details of the component elements in the cost of each job may be recorded and the total of each prime cost element shown separately. A page or more in the Cost Ledger, according to the particular requirements of the business, is allocated to each specific job or contract. For example, a typical page in the Job Cost Ledger would be ruled as in the example on page 126.

An alternative form of ruling provides for a more detailed classification of labour and materials by the use of further analysis columns, *e.g.*, labour may be sub-divided, separate columns being used for bricklayers, joiners, painters, etc., in the case of the building trade.

Each Job Account is debited either directly from the various abstracts, or through the Journal, with the details of the amount of Direct Materials, Direct Stores, Direct Wages and Direct Expenses applicable to that particular job. These entries are made in their respective columns in the Job Account, stores and materials being treated as expenditure

Job No. . . . . Name . . . . . .

Dr Cr

Date	C J Fo	Direct Wages	Direct Materials	Direct Expenses	Summary		Date	Particulars.	C J Fo	£ s d
					Particulars	Totals				
					Direct Wages					
					„ Materials					
					„ Expenses					
					PRIME COST					
					Works Oncost					
					WORKS COST					
					Office Oncost					
					TOTAL COST					

of a similar nature and recorded in the same column. The double entry is completed by crediting the respective total accounts in the General Cost Ledger, as explained later in this chapter.

As and when each job is completed, the relative account in the Job Cost Ledger will be debited with the amounts of Works Oncost and Office Oncost applicable to the particular job, calculated on the appropriate basis, and accounts headed with these names in the General Cost Ledger will be credited accordingly.

The Job Account is then credited with the quoted or invoiced price of the job, and a debit for the same amount is posted to the " Completed Jobs Account." If the credit side of the Job Account is greater than the total of the debit side, the difference represents the amount of profit made on the job, but if the total of the debit side exceeds that of the credit side, the difference will represent the amount of loss incurred. The Job Account is closed by inserting the amount of the balance, and debiting, or crediting, as the case may be, an account headed " Profit and Loss on Jobs Account " in the General Cost Ledger. Thus losses will be debited and profits credited to this account.

If the job was executed for stock, the question of profit or loss will not at the moment arise, and the Job Account will be closed by crediting it with an amount equal to the total of the debit side, a corresponding debit being made in a " Finished Stock Account " in the General Cost Ledger.

In certain cases, appropriations are made from stocks of finished parts in order to complete a customer's order. It is then necessary to debit the particular Job Account with the total cost of such finished parts, exclusive in certain cases of any works or office oncost applicable to such parts, otherwise oncost may be inadvertently charged twice on such finished parts. The corresponding entry is effected by crediting Finished Stock Account in the General Cost Ledger with the value of finished parts requisitioned for use in connection with the job.

Where finished parts are supplied direct to customers from stock, the necessary double entry is effected by debiting " Sales from Finished Stock Account " and crediting " Finished Stock Account " with the selling price of such parts. In this way the profit on such sales will be shown in the latter account.

It is customary in the case of certain businesses to withhold information from the general costing staff of the amount of profit or loss on jobs and contracts. This desire can be effected by the use of a Private Contract, or Job Ledger. The individual jobs in the Job Cost Ledger are not credited in this case with the agreed selling or quoted price, but merely with the total cost, the corresponding debit being made in a special Job Account in the Private Job Ledger. Thus no balances are shown on the Job Accounts in the Job Cost Ledger. The Job Accounts in the Private Job Ledger are then credited with the agreed selling prices, the profit or loss on each job thus being shown in this ledger. The entries in this book should be made by a responsible official or by one of the proprietors of the business in order to ensure the requisite degree of secrecy. This method is merely one of the modern developments in cost accounting and does not affect the fundamental principles explained previously in this chapter.

A further practical point that should be noted is the use of loose-leaf ledgers and card ledgers for costing purposes, and it will be found that the adoption of this system is particularly convenient inasmuch as it enables records of completed jobs to be withdrawn from the current Job Cost Ledger. Where machine accounting is employed (see Chapter XVI) the use of loose leaves or cards is essential.

General Cost Ledger.

The General Cost Ledger contains all the accounts other than the individual Job or Contract Accounts referred to above. This ledger is ruled in the same manner as any of the ledgers utilised in connection with the financial accounts of a business. In actual fact it may be said to correspond to a Nominal Ledger, as from the information contained therein a Manufacturing Account can be compiled.

Strictly speaking, one ledger would suffice to contain all the accounts, both " nominal " and " job," but for purposes of convenience, two distinct ledgers are usually adopted. Where only one ledger is utilised, this would of necessity require to be kept on loose-leaf principles, in order to accommodate both the specially ruled Job Accounts and the ordinary ruled Nominal (Cost) Accounts.

The General Cost Ledger, as we have already stated, is ruled similarly to an ordinary Financial Ledger, and should contain at least accounts relating to the following:

Direct Wages.
Direct Materials.

Stores.
Direct Expenses.
Works Oncost.
Office Oncost.
Works Oncost Suspense.
Office Oncost Suspense.
Finished Stock, or Parts.
Sales from Finished Stock.
Profit and Loss on Jobs.
Completed Jobs.
Profit and Loss on Sales from Stock.
Manufacturing Account.

In the Job Cost Ledger, as already stated, the individual Job Accounts are closed when the respective jobs are completed, by crediting such accounts with the agreed selling price, as per invoice or quotation, and debiting the Completed Jobs Account in the General Cost Ledger with a corresponding amount. The Job Accounts are then debited or credited, as the case may be, with the amounts required to balance them, the Profit and Loss on Jobs Account being credited or debited accordingly.

The various accounts in the General Cost Ledger are then closed by transferring them to the Manufacturing Account. Before doing so, however, a Trial Balance should be taken out in order to test the arithmetical accuracy of the postings—the Cost Ledgers being arranged on the double entry principle.

The Manufacturing Account in the Cost Ledger is then constructed from the information contained in the Trial Balance. Adjustments relating to the uncompleted jobs—the accounts for which are, of course, not closed—will have to be made as regards the proportion of oncost absorbed to the date of the Trial Balance. These adjustments are made by means of the following Journal entries:

Works Oncost Suspense Account *Dr.* ....
To Works Oncost Account ... ...
Being amount of works oncost on uncompleted jobs as at......................

Office Oncost Suspense Account *Dr.* ....
To Office Oncost Account ... ...
Being amount of office oncost on uncompleted jobs as at......................

At the beginning of the ensuing period the Oncost Accounts would be re-adjusted by means of the reverse Journal entries to the above, viz.:

Works Oncost Account ... ... *Dr.* ....
To Works Oncost Suspense Account ... .
Being adjustment on Works Oncost Suspense Account in respect of works oncost on uncompleted jobs as at...................

Office Oncost Account ... ... *Dr.* ....
To Office Oncost Suspense Account ... .
Being adjustment on Office Oncost Suspense Account in respect of office oncost on uncompleted jobs as at................

Thus it will be seen that the Oncost Suspense Accounts are closed at the commencement of the next period.

Alternatively, the use of Suspense Accounts may be dispensed with by bringing down as debit balances on Works Oncost Account and Office Oncost Account the amount of oncost on uncompleted jobs in a similar manner to that utilised in the treatment of accrued expenses in the general financial accounts of a business. It is suggested, however, that the former method should be adopted for costing purposes, as tending to greater clarity.

The cost and financial accounts can be linked up by means of the Manufacturing Account in the General Cost Ledger and a Work-in-Progress Account in the financial Nominal (or Private) Ledger, the latter account containing the same items as the Manufacturing Account, with the sides reversed.

Practical Example.

The significance of the foregoing remarks may be emphasised by means of a detailed practical example, illustrating the manner in which the theory of double entry is applied to the cost accounts of a concern. It is imperative that this example should be studied with particular attention. note being taken of the twofold nature of each transaction.

EXAMPLE.

From the following particulars you are required to make the necessary Journal entries and to post such entries to the Job Cost Ledger and General Cost Ledger. Works and Office Oncost on uncompleted jobs must be taken into consideration. The arithmetical accuracy of your work should be checked by the extraction of a Trial Balance as at 31st March, 19...... Finally a Manufacturing Account must be prepared from your completed Trial Balance.

19......

			£	s.	d.
Mch.	1.	Direct Materials:—			
		Job No. 36	2	10	0
		,, 42	1	15	9
		,, 56		18	7
		,, 60	6	10	8
,,	8.	Direct Wages:—			
		Job No. 36	7	10	0
		,, 42	5	18	7
		,, 56	2	13	3
		,, 60	1	10	5
,,	10.	Hire of Crane for Job. No. 42	1	11	4
,,	12.	Purchased Special Pattern for Job No 60		17	9
..	15.	Direct Stores for Works Order No. 33	7	15	6
		Direct Stores for Works Order No. 38	8	14	7
,,	22.	Direct Wages:—			
		Works Order No. 33	10	18	9
		,, ,, 38	20	17	2
		Job No. 36	4	13	2
		,, 42	1	19	8
,,	30.	Finished Parts for Job No. 36	2	3	6

In making the necessary entries provision should be made for the following:

Jobs Nos. 36 and 42, and Works Orders Nos. 33 and 38 are completed.

Sales of Finished Stock during the month amounted to £40 10s. 7d.

Finished Stock on Hand at 31st March: £65 10s. 6d. (No stock on hand at 1st March).

Contract Selling Prices of the Jobs are:—

No. 36, Tyndal & Young, £40.
" 42, Reeves & Carter, £25 10s.
" 56, Mynotts, Ltd., £32.
" 60, G. Stratton, £18.

Works Oncost is to be calculated as 100% on Direct Wages.

Office Oncost is to be calculated as 10% on Works Cost.

JOURNAL.

The Journal entries in respect of the given transactions for the month of March are as follows:

19...		L.F	£	s.	d.	£	s.	d.
Mch. 1	Job No. 36 ... *Dr.*	1	2	10	0			
	To Direct Materials	7				2	10	0
" "	Job No. 42 ... *Dr.*	2	1	15	9			
	To Direct Materials	7				1	15	9
" "	Job No. 56 ... *Dr.*	3		18	7			
	To Direct Materials	7					18	7
" "	Job No. 60 ... *Dr.*	4	6	10	8			
	To Direct Materials	7				6	10	8
	Total	*c/f*	11	15	0	11	15	0

		L.F.	£	s.	d	£	s	d.
19...		*b/f*	11	15	0	11	15	0
Mch. 8	Job No. 36 ... *Dr.*	1	7	10	0			
	To Direct Wages ...	8				7	10	0
" "	Job No. 42 ... *Dr.*	2	5	18	7			
	To Direct Wages ...	8				5	18	7
" "	Job No. 56 ... *Dr.*	3	2	13	3			
	To Direct Wages ...	8				2	13	3
" "	Job No. 60 ... *Dr.*	4	1	10	5			
	To Direct Wages ...	8				1	10	5
" 10	Job No. 42 ... *Dr.*	2	1	11	4			
	To Direct Expenses *For Hire of Crane*	9				1	11	4
" 12	Job No. 60 ... *Dr.*	4		17	9			
	To Direct Expenses *For Special Pattern*	9					17	9
" 15	W.O. No. 33 ... *Dr*	5	7	15	6			
	To Direct Stores .	10				7	15	6
" "	W.O. No. 38 ... *Dr.*	6	8	14	7			
	To Direct Stores ...	10				8	14	7
" 22	W.O. No. 33 ... *Dr.*	5	10	18	9			
	To Direct Wages ...	8				10	18	
" "	W.O. No. 38 ... *Dr.*	6	20	17	2			
	To Direct Wages ...	8				20	17	2
" "	Job No. 36 ... *Dr*	1	4	13	2			
	To Direct Wages ...	8				4	13	2
" "	Job No. 42 ... *Dr*	2	1	19	8			
	To Direct Wages ...	8				1	19	8
" 30	Job No. 36 ... *Dr.*	1	2	3	6			
	To Finished Stock ...	15				2	3	6
" 31	Sales from Finished Stock *Dr.*	16	40	10	7			
	To Finished Stock ...	15				40	10	7
	Total	*c/f*	129	9	3	129	9	3

Alternatively, certain of the above Journal entries may be *compounded* for purposes of convenience, as explained earlier in this chapter, *viz.*:

19 .			£	s.	d.	£	s.	d.
Mch. 1	Sundries .. .	*Dr.*						
	To Direct Materials .					11	15	0
	Job No. 36		2	10	0			
	,, 42		1	15	9			
	,, 56 . .			18	7			
	,, 60 .		6	10	8			

For purposes of simplicity, however, each item is shown in this example in the form of a separate Journal entry.

Alternatively, where materials and wages are posted directly from the periodical Materials and Wages Abstracts, the entries in the Cost Journal can be confined to the allocation of oncost and miscellaneous items.

At the end of the period, the various adjusting entries are made by means of the following Journal entries:

		L. F.	£	s.	d	£	s.	d.
19...		*b/f*	129	9	3	129	9	3
Mch. 31	Job No. 36 .. *Dr.*	1	12	3	2			
	To Works Oncost .	11				12	3	2
	Being 100% *on Direct Wages*							
,, ,,	Job No. 36 ... *Dr.*	1	2	18	0			
	To Office Oncost .	12				2	18	0
	Being 10% *on Works Cost,* £28 19*s.* 10*d.*							
,, ,,	Job No. 42 .. *Dr.*	2	7	18	3			
	To Works Oncost ...	11				7	18	3
	Being 100% *on Direct Wages*							
,, ,,	Job No. 42 ... *Dr.*	2	1	18	4			
	To Office Oncost ...	12				1	18	4
	Being 10% *on Works Cost,* £19 3*s.* 7*d.*							
	Total	*c/f*	154	7	0	154	7	0

		L. F.	£	s.	d.	£	s.	d.
19...		*b/f*	154	7	0	154	7	0
Mch. 31	Works Oncost Suspense A/c. ... ... *Dr.*	13	4	3	8			
	To Works Oncost ..	11				4	3	8
	Being Works Oncost accrued on jobs uncompleted at this date—Job No. 56, *£*2 13*s.* 3*d.*, *and Job No.* 60, *£*1 10*s.* 5*d.*							
,, ,,	Office Oncost Suspense A/c. .. .. *Dr.*	14	1	13	5			
	To Office Oncost	12				1	13	5
	Being Office Oncost accrued on uncompleted jobs at this date—Job. No. 56, 12*s.* 6*d.* (10% *on* £6 5*s.* 1*d.*), *Job No.* 60, £1 0*s.* 11*d.* (10% *on* £10 9*s.* 3*d.*).							
,, ,,	Job No. 36 . . *Dr.*	1	8	2	2			
	To Profit and Loss on Jobs A/c. .. .	19				8	2	2
,, ,,	Job No. 42 .. *Dr.*	2	4	8	1			
	To Profit and Loss on Jobs A/c. ...	19				4	8	1
,, ,,	W.O. No. 33 ... *Dr.*	5	10	18	9			
	To Works Oncost ...	11				10	18	9
	Being 100% *on Direct Wages*							
,, ,,	W.O. No. 33 ... *Dr.*	5	2	19	4			
	To Office Oncost ...	12				2	19	4
	Being 10% *on Works Cost, £*29 13*s.* 0*d.*							
,, ,,	W.O. No. 38 ... *Dr.*	6	20	17	2			
	To Works Oncost ...	11				20	17	2
	Being 100% *on Direct Wages*							
,, ,,	W.O. No. 38 ... *Dr.*	6	5	0	11			
	To Office Oncost ...	12				5	0	11
	Being 10% *on Works Cost. £*50 8*s.* 11*d.*							

		L.F.	£	s.	d.	£	s.	d.
19...		*b/f*	212	10	6	212	10	6
Mch. 31	Completed Jobs ... *Dr.*	18	40	0	0			
	To Job No. 36 ...	1				40	0	0
	Being contract selling price of completed job.							
,, ,,	Completed Jobs . . *Dr.*	18	25	10	0			
	To Job No. 42 ...	2				25	10	0
	Being contract selling price of completed job.							
,, ,,	Finished Stock ... *Dr.*	15	32	12	4			
	To W.O. No. 33 ..	5				32	12	4
	Being Works Order completed.							
,, ,,	Finished Stock ... *Dr.*	15	55	9	10			
	To W.O. No. 38 ...	6				55	9	10
	Being Works Order completed.							
,, ,,	Finished Stock ... *Dr.*	15	20	2	5			
	To Profit and Loss on Finished Stock Sales	17				20	2	5
	Being transfer of profit.							
,, ,,	Finished Stock (New A/c.) *Dr.*	15	65	10	6			
	To Finished Stock (Old A/c.) ...	15				65	10	6
	Being finished stock on hand as at this date.							
			£451	15	7	£451	15	7

The postings are then made to the Job Cost Ledger and General Cost Ledger as shown in the following pages. A Trial Balance should then be taken out and on proof of the accuracy of the postings a Manufacturing Account may be prepared. The exact procedure is clearly shown in the following pages and the reader is advised to trace out the double entry in respect of each transaction.

JOB COST LEDGER.

Dr Job No 36 Tyndal & Young Folio 1 Cr

Date	J Fo	Direct Wages			Direct Materials			Direct Expenses			Summary				Date	Pars	J Fo			
		£	s	d	£	s	d	£	s	d		£	s	d				£	s	d
19 Mch. 1					2	10	-				Direct Wages	12	3	2	19 Mch. 30	By Completed Jobs A/c		40	-	-
" 8		7	10								Direct Materials	4	13	6						
" 22		4	13	2							Direct Expenses									
" 30					2	3	6				Prime Cost	16	16	8						
		12	3	2	4	13	6				Works Oncost	12	3	2						
											Works Cost	28	19	10						
											Office Oncost	2	18							
											Total Cost	31	17	10						
											Profit (to P & L A/c)	8	2	2						
											£	40					£	40	-	-

Dr Job No 42. Reeves & Carter Folio 2 Cr

Date	J Fo	Direct Wages			Direct Materials			Direct Expenses			Summary				Date	Pars	J Fo			
		£	s	d	£	s	d	£	s	d		£	s	d				£	s	d
19 Mch. 1					1	15	9				Direct Wages	7	18	3	19 Mch. 30	By Completed Jobs A/c		25	10	
" 8		5	18	7							Direct Materials	1	15	9						
" 10								1	11	4	Direct Expenses	1	11	4						
" 22		1	19	8							Prime Cost	11	5	4						
		7	18	3	1	15	9	1	11	4	Works Oncost	7	18	3						
											Works Cost	19	3	7						
											Office Oncost	1	18	4						
											Total Cost	21	1	11						
											Profit (to P & L A/c)	4	8	1						
											£	25	10	-			£	25	10	-

Dr Job No 56. Mynotts, Ltd. Folio 3 Cr

Date	J Fo	Direct Wages			Direct Materials			Direct Expenses			Summary				Date	Pars	J Fo			
		£	s	d	£	s	d	£	s	d		£	s	d				£	s	d
19.. Mch. 1					-	18	7				Direct Wages				19.					
" 8		2	13	3							Direct Materials									
											Direct Expenses									
											Prime Cost									
											Works Oncost									
											Works Cost									
											Office Oncost									
											Total Cost									

Job No 60 G Stratton Folio 4

Dr Cr

Date	J Fo	Direct Wages			Direct Materials			Direct Expenses			SUMMARY				Date	Pars	J Fo			
19..		£	s	d	£	s	d	£	s	d		£	s	d	19			£	s	d
Mch 1					6	10	8				Direct Wages									
" 8		1	10	5							Direct Materials									
" 12								-	17	9	Direct Expenses									
											PRIME COST									
											Works Oncost									
											WORKS COST									
											Office Oncost									
											TOTAL COST									

W O No 33 Stock Folio 5

Dr Cr

Date	J Fo	Direct Wages			Direct Materials			Direct Expenses			SUMMARY				Date	Pars	J Fo			
19		£	s	d	£	s	d	£	s	d		£	s	d	19			£	s	d
Mch 15					7	15	6				Direct Wages	10	18	9	Mch 31	By Finished Stock		32	12	4
" 22		10	18	9							Direct Materials	7	15	6						
		10	18	9	7	15	6				Direct Expenses		-	-						
											PRIME COST	18	14	3						
											Works Oncost	10	18	9						
											WORKS COST	29	13							
											Office Oncost	2	19	4						
											TOTAL COST	£32	12	4				£32	12	4

W O No 38 Stock Folio 6

Dr Cr

Date	J Fo	Direct Wages			Direct Materials			Direct Expenses			SUMMARY				Date	Pars	J Fo			
19.		£	s	d	£	s	d	£	s	d		£	s	d	19.			£	s	d
Mch 15					8	14	7				Direct Wages	20	17	2	Mch 31	By Finished Stock		55	9	10
" 22		20	17	2							Direct Materials	8	14	7						
		20	17	2	8	14	7				Direct Expenses	-	-	-						
											PRIME COST	29	11	9						
											Works Oncost	20	17	2						
											WORKS COST	50	8	11						
											Office Oncost	5	-	11						
											TOTAL COST	£55	9	10				£55	9	10

GENERAL COST LEDGER

Direct Materials

Folio 7.

Dr. Cr.

19				£	s.	d.	19				£	s.	d.
Mch.	31	To Mfg. A/c		11	15	-	Mch.	1	By Job No. 36		2	10	-
							,,	,,	,, ,, ,, 42		1	15	9
							,,	,,	,, ,, ,, 56		-	18	7
							,,	,,	,, ,, ,, 60		6	10	8
			£	11	15	-				£	11	15	-

Direct Wages

Folio 8

Dr. Cr.

19				£	s	d	19				£	s	d
Mch.	31	To Mfg. A/c.		56	1	-	Mch.	8	By Job No. 36		7	10	-
							,,	,,	,, ,, ,, 42		5	18	7
							,,	,,	,, ,, ,, 56		2	13	3
							,,	,,	,, ,, ,, 60		1	10	5
							,,	22	,, W.O. No. 33		10	18	9
							,,	,,	,, ,, ,, 38		20	17	2
							,,	,,	,, Job No. 36		4	13	2
							,,	,,	,, ,, ,, 42		1	19	9
			£	56	1	-				£	56	1	-

Direct Expenses.

Folio 9

Dr. Cr.

19				£	s.	d	19				£	s	d
Mch.	31	To Mfg. A/c.		2	9	1	Mch.	10	By Job No. 42		1	11	4
							,,	12	,, ,, ,, 60		-	17	9
			£	2	9	1				£	2	9	1

Stores.

Folio 10

Dr. Cr

19				£	s	d.	19				£	s	d
Mch.	31	To Mfg. A/c.		16	10	1	Mch.	15	By W.O. No. 33		7	15	6
							,,	,,	,, ,, ,, 38		8	14	7
			£	16	10	1				£	16	10	1

Works Oncost

Folio 11

Dr. Cr.

19				£	s	d	19				£	s	d
Mch.	31	To Mfg. A/c		56	1	-	Mch.	31	By Job No. 36		12	3	2
							,,	,,	,, ,, ,, 42		7	18	3
							,,	,,	,, W O No 33		10	18	9
							,,	,,	,, ,, ,, 38		20	17	2
							,,	,,	,, W O Suspense		4	3	8
			£	56	1	-				£	56	1	-

Office Oncost.

Folio 12

Dr. Cr.

19.				£	s	d	19				£	s	d
Mch	31	To Mfg. A/c		14	10	-	Mch	31	By Job No. 36		2	18	-
							"	"	" " 42		1	18	4
							"	"	" W O No. 33		2	19	4
									" " 38		5	-	11
							"	"	" Off O. Suspense		1	13	5
			£	14	10					£	14	10	-

Works Oncost Suspense

Folio 13

Dr. Cr.

19..				£	s	d	19.				£	s	d
Mch	31	To Works Oncost		4	3	8							

Office Oncost Suspense

Folio 14.

Dr. Cr.

19..				£	s	d	19..				£	s	d
Mch	31	To Office Oncost		1	13	5							

Finished Stock.

Folio 15

Dr. Cr.

19..				£	s	d	19.				£	s	d
Mch	31	To W.O. No. 33		32	12	4	Mch	30	By Job No. 36		2	3	6
"	"	" " 38		55	7	10	"	31	" Sales		40	10	7
"	"	" Mfg. A/c (Profit on Sales from Stock.)		20	2	5	"	"	Stock on hand	c/d	65	10	6
			£	108	4	7				£	108	4	7
Mch	31	To Balance	b/d	65	10	6							

Sales from Finished Stock.

Folio 16.

Dr. Cr.

19..				£	s	d	19..				£	s	d
Mch	31	To Finished Stock		40	10	7	Mch	31	By Mfg. A/c		40	10	7

Profit & Loss on Sales from Stock.

Folio 17.

Dr. Cr.

19..				£	s	d	19..				£	s	d
Mch	31	To Mfg. A/c		20	2	5	Mch.	31	By Finished Stock		20	2	5

Completed Jobs.

Folio 18

Dr. Cr.

19..				£	s	d	19..				£	s	d
Mch	31	To Job No. 36		40	-	-	Mch	31	By Mfg. A/c		65	10	-
"	"	" " " 42		25	10	-							
			£	65	10	-				£	65	1	

Profit & Loss on Jobs.

Folio 19.

Dr. Cr.

19..				£	s.	d.	19..				£	s.	d.
Mch	31	To Mfg. A/c.		12	10	3	Mch	31	By Job No. 36		8	2	2
							"	"	" " " 42		4	8	1
			£	12	10	3		"		£	12	10	3

Manufacturing A/c

Dr. Folio 20 Cr.

19..				£	s	d	19..				£	s	d
Mch	31	To Completed Jobs		65	10	-	Mch	31	By Direct Materials		11	15	-
"	"	" Sales from Stock		40	10	7	"	"	" " Wages		56	1	-
				106	-	7	"	"	" " Stores		16	10	1
"	"	" Balance	c/d	83	18	3	"	"	" " Expenses		2	9	1
							"	"	Works Oncost		56	1	-
							"	"	" Office Oncost		14	10	-
											157	6	2
							"	"	" Profit on Jobs		12	10	3
							"	"	" Sales from Stock		20	2	5
			£	189	18	10				£	189	18	10
							Mch	31	By Balance	b/d	83	18	3

TRIAL BALANCE
31st March 19.

		Dr £	s	d	Cr £	s	d
JbL 3	Job A/c No 56	3	11	10			
" 4	" " 60	8	18	10			
GlL 7	Direct Materials				11	15	-
" 8	Wages				56	1	-
" 9	" Expenses				2	9	1
" 10	Stores				16	10	1
" 11	Works Oncost				56	1	-
" 12	Office Oncost				14	10	-
13	Works Oncost Suspense	4	3	8			
" 14	Office Oncost Suspense	1	13	5			
" 15	Finished Stock	65	10	6			
" 16	Sales from Finished Stock	40	10	7			
" 17	Profit & Loss on Sales				20	2	5
" 18	Completed Jobs	65	10				
" 19	Profit & Loss on Jobs				12	10	3
	£	189	18	10	£189	18	10

After the Manufacturing Account has been prepared, the remaining balances on open accounts in the two cost ledgers will represent the opening balances of the ensuing period, as shown in the following Trial Balance:

	£	s.	d.	£	s.	d.
Jobs Uncompleted	12	10	8			
Works Oncost Suspense Account	4	3	8			
Office Oncost Suspense Account	1	13	5			
Finished Stock	65	10	6			
Manufacturing Account				83	18	3
	£83	18	3	£83	18	3

Thus at the commencement of the next period the Manufacturing Account is shown with a credit balance equivalent to the value of finished stock on hand and uncompleted jobs.

Test Questions

A. What are the advantages of keeping the Cost Accounts on the double entry principle?

B. Explain why the use of a Journal for costing purposes is not essential.

C. Draw up a specimen cost ledger sheet for Job Costing.

D. In what manner may information be withheld from the costing staff as regards the amount of profit or loss on individual jobs?

E. Show by means of Journal entries the manner in which Works and Office Oncost are added to Work-in-Progress at the end of a financial period.

F. What do you understand by Oncost Suspense Accounts, and what are their functions? Explain in what manner the use of these accounts may be dispensed with.

G. Explain how a Manufacturing Account is compiled in the case of Job Costing.

H. A small builder doing (*a*) Contract Work, and (*b*) Jobbing Work has, hitherto, had only an annual Profit and Loss Account and Balance Sheet, showing the result of the whole of his operations. His past annual accounts showed a loss when he had expected a profit. He desires to organize his business so that in future he can obtain a cost statement in respect of each contract or job separately. The additional work must be kept to a minimum.

Set out in detail your recommendations, showing clearly the connection, if any, between the new costing records and the existing financial books. You may assume any figures or further details you need in order to make your recommendations clear.

J. Explain how you close the Cost Ledgers and treat Work-in-Progress.

K. From the following information construct the Job Account in the Cost Ledger:

Job No. 92.	Jan 5	12	19	26
Direct Wages:—				
Shapers	£138	£95	£502	£97
Drillers	95	86	74	32
Turners	106	183	472	110
Fitters	114	132	196	89

Direct Materials were purchased, amounting to £3,195. Stores issued for the Job: £1,920. When the Machine had been completed and delivered to the site, Erection Expenses were incurred as follows: Fitters' and Assistants' Wages, £225. Twenty Fitters and Thirty Labourers were each allowed 2s. 6d. per day for Expenses, and the inclusive time taken for erection was 15 days. Works Oncost to be provided for on the completed job at 75 per cent. on Direct Wages, and Office Oncost at 12½ per cent. on Works Cost.

L. From the following information prepare the Job Account (with proper rulings) in the Cost Ledger:

Job 165. (Rolling Machine)

Direct Wages:—	Sept. 6	13	20	27
Joiners	£170	£140	£95	£130
Fitters	105	90	110	120
Smiths	75	45	50	60
Turners	30	35	40	50

Direct Materials purchased for Job	£1,500
Stores issued for Job	£550
Erection Expenses on site (Fitters and Assistants)	£115

Works Oncost to be charged at 60% on Direct Wages.
Office Oncost to be charged at 5% on Works Cost.
The Selling Price of the machine erected on site was £4,350.

State how the double entry in relation to these items is completed in the Cost Ledger.

M. From the following Cost Ledger Balances, construct a Manufacturing Account:

	£		£
Stores	683	Finished Stock ...	8,754
Direct Materials ...	12,673	Direct Wages ...	24,341
Works Oncost ..	23,274	Sales from Stock ...	1,003
Direct Expenses ..	228	Profit on Completed Jobs	11,069
Job No. 397 ...	571	Office Oncost Suspense A/c. ...	208
Job No. 426 ...	982	Completed Jobs A/c	65,789
Profit on Sales from Stock	230	Works Oncost Suspense A/c. ...	515
Office Oncost ...	5,324		

CHAPTER XI

RECONCILIATION OF COST BOOKS WITH FINANCIAL BOOKS

When the Manufacturing Account has been constructed, the next step is to compare the profit shown therein with the profit as ascertained by the Trading and Profit and Loss Accounts in the Financial Books, and to reconcile the difference between the two results. It would be a mere, if not a remote, coincidence, if both figures agreed exactly, as there is inevitably an element of estimate or approximation in the Cost Accounts.

The object of making a reconciliation between the two sets of accounts is to show to what extent and in what respects the figures differ, with a view to minimising such discrepancies in future Cost Records.

This reconciliation may involve an analysis or a subdivision of the financial accounts in order to compare the corresponding items in both sets of accounts, *e.g.*, the Purchases Account in the financial books must be divided into two parts in respect of direct and indirect materials.

Sources of Discrepancies.

If the arithmetical work in relation to the Cost Records has been accurately performed, discrepancies will arise mainly in connection with Oncost and Stores. The Prime Cost entries, and entries relating to Completed Jobs, Sales from Finished Stock, and Profit and Loss on Sales from Finished Stock should always agree exactly with the corresponding entries in the Financial Accounts.

With regard to Oncost, it must be borne in mind that whilst the total of the Works and Office Expenses, as shown in the Financial Accounts, represents the *actual* expenditure in respect of works, administration, selling and distribution expenses during the period under review, the total of the

Works and Office Oncost absorbed in the Cost Records during the same period constitutes only a *forecast of* expenditure in relation to probable output, made at the beginning of the period, based upon the corresponding expenditure in a selected previous period. Thus any difference may be due to the actual expenses or output being greater or less than anticipated.

Furthermore, the Stock of Stores on hand at the end of the period, as ascertained by a valuation or inventory, may show that the quantity, or value, of Stores consumed is greater than that ascertained from the Cost Records. This discrepancy is mainly due to the difficulties which arise in connection with the pricing of Stores Requisitions, and to leakages which inevitably occur when small quantities are taken from time to time from the bulk, or to the "inherent vice" (*i.e.*, liability to loss by evaporation, shrinkage, etc.) of the materials themselves.

Other sources of difference between the results shown by the Cost Accounts and those shown by the Financial Accounts are to be located in the differing bases of valuation of stocks of raw materials, etc., and the inclusion of certain expenses in the Financial Accounts that are disregarded in the Cost Accounts. For example, the closing stock in the Financial Accounts, may be valued at current market price below cost price, whereas the latter value is usually adopted in the Cost Accounts, while such financial items as cash discounts, bad debts, loan interest, etc., may appear in the former accounts and not in the latter. Conversely, certain items may appear in the Cost Accounts and not in the Financial Accounts, *e.g.*, a charge in lieu of rent where the premises are owned by the manufacturer.

Reconciliation Statement.

It is now proposed to illustrate the foregoing remarks by a detailed and practical comparison of the Financial Accounts with the Cost Accounts. For this purpose, the fully worked example in the preceding chapter will be re-considered.

The Profit shown by the Manufacturing Account in the preceding chapter amounts to £32 12s. 8d., consisting of :

	£ s. d.
Profit on Completed Jobs	12 10 3
Profit on Sales from Finished Stock ...	20 2 5
	£32 12 8

The amount of profit on sales from finished stock, as shown in the Cost Accounts, should agree exactly with that shown on the corresponding item in the Financial Accounts. Thus the source of the discrepancy will be located by a detailed comparison of those accounts relating to completed jobs in both sets of accounts.

FINANCIAL TRADING AND PROFIT AND LOSS ACCOUNTS

FOR THE MONTH ENDED 31ST MARCH, 19...... ..

Dr.		£ s. d.	*Cr.*	£ s. d.	£ s. d.
To Raw Materials Consumed		11 15 0	By Sales (Jobs)	65 10 0	
,, Convertible Stores Consumed ..		16 15 6	,, Sales (Fin. Stk.) .	40 10 7	106 0 7
,, Productive Wages		56 1 0	,, Stock on Hand	65 10 6	
,, Direct Expenses .		2 9 1	,, Work in Progress ..	18 7 9	83 18 3
,, Balce. (Gross Profit) c/d ..		102 18 3			
		£189 18 10			£189 18 10
	£ s. d.	£ s. d.			£ s. d.
To Works Expenses:			By Gross Profit b/d .		102 18 3
Unproductive Wages .	42 15 0				
Rates & Taxes	5 10 3				
Repairs ...	2 0 0				
Depreciation ..	4 15 0				
Sdry. Exs. ...	2 19 9				
		58 0 0			
To Office Expenses:					
Salaries ...	9 10 6				
Rates & Taxes	1 15 0				
Sdry. Exs. ...	1 8 6				
Depreciation ...	1 4 9				
		13 18 9			
To Balce. (Net Profit) ..		30 19 6			
		£102 18 3			£102 18 3

The Financial Trading and Profit and Loss Accounts, which are assumed to be as shown on page 147, should be arranged in such a manner as to facilitate comparison with the Cost Records.

It will be seen that the net profit as shown by the Financial Accounts amounts to £30 19s. 6d. as compared with a net profit of £32 12s. 8d. shown in the Cost Accounts. Thus the net profit in the latter case exceeds that of the former by £1 13s. 2d., which difference, although not excessive, should be accounted for by a detailed comparison of the two sets of accounts, in order to facilitate more accurate costing records being kept in ensuing periods.

A comparison of the above account with the Manufacturing Account in the preceding chapter will show that the amounts shown in respect of Direct Materials, Direct Wages, Direct Expenses, Completed Jobs, and Sales from Finished Stock are identical in both accounts. On the other hand, it will be observed that the following items do not agree:

(Cost Accounts)	*(Financial Accounts)*
Stores.	Convertible Stores.
Works Oncost.	Works Expenses.
Office Oncost.	Office Expenses.

The sources of the discrepancies between the above items are indicated in the following statement:

RECONCILIATION STATEMENT

31ST MARCH, 19......

	£	s.	d.	£	s.	d.
Stores Consumed as shown by the Financial Accounts	16	15	6			
Stores Consumed according to the Cost Accounts	16	10	1			
Difference *undercharged* in Cost Accounts:					5	5
Works Expenses as shown in the Financial Accounts	58	0	0			
Works Oncost as absorbed in the Cost Accounts	56	1	0			
Difference *undercharged* in Cost Accounts:				1	19	0
				£2	4	5

	£	s.	d.	£	s.	d.
Office Expenses as shown in the Financial Accounts	13	18	9			
Office Oncost as absorbed in the Cost Accounts	14	10	0			
Difference *overcharged* in Cost Accounts:					11	3
Net Difference *undercharged* in Cost Accounts:				£1	13	2

Alternative forms of Reconciliation Statements may be drawn up as shown below:

	£	s.	d.	£	s.	d.
Profit as shown in Cost Accounts				32	12	8
Add Office Oncost overcharged in Cost Accounts ...					11	3
				33	3	11
Less Stores Consumed undercharged in Cost Accounts		5	5			
Works Oncost undercharged in Cost Accounts	1	19	0			
				2	4	5
Profit as shown in Financial Accounts				£30	19	6

RECONCILIATION ACCOUNT

	£	s.	d.		£	s.	d.
Under-recovery of Works Oncost ...		5	5	Net Profit as per Cost Accounts ...	32	12	8
Under-recovery of Stores Consumed	1	19	0	Over-recovery of Office Oncost ..		11	3
Net Profit as per Financial Accounts	30	19	6				
	£33	3	11		£33	3	11

Future Adjustment of Discrepancy.

Thus it will be seen that more accurate results in the Cost Accounts could be obtained by the adoption of different rates of Oncost from those shown in the preceding chapter.

The Works Oncost should have been taken as 103.5 per cent. instead of 100 per cent. on Direct Wages, and Office Oncost should have been taken at 9.4 per cent. instead of 10 per cent. on Works Cost, if the Works Oncost rate was adjusted to 103.5 per cent. In this way both the undercharge of Works Oncost and the overcharge of Office Oncost in the Cost Accounts would be avoided. Fractional percentages in oncost rates, however, increase the clerical labour of the costing staff in making the necessary calculations and do not automatically yield commensurate advantageous results, although the additional labour involved can be minimised by the use of calculating machines as described in Chapter XVI. If, however, the undercharge or overcharge of Oncost are the result of a deficiency or surplus of orders as compared with the normal expected output of the period, the Oncost rates, which have been based upon normal production and expenses will not require adjustment. The difference in the values of Stores consumed cannot readily be overcome, as small discrepancies in this case are inevitable, although a more rigid system of stores supervision may minimise such discrepancies. In the case of "inherent vice", however, the leakage is sometimes recovered by adding to the value, or cost, of the materials requisitioned a percentage equal to the ascertained normal percentage of such leakage.

When the works or office expenses of the current period have not been wholly "recovered" the "under-recovered" balances may be carried forward by crediting the Manufacturing Account and debiting a Works (or Office) Oncost Adjustment Account or, where Control Accounts are kept (see Chapter XII), by writing off the balances to the debit of the Cost Ledger Control Account. Conversely, any "over-recovered" balances may be similarly treated by debiting the Manufacturing Account and crediting the Works (or Office) Oncost Adjustment Account or transferring the balances to the credit of the Cost Ledger Control Account.

It must be clearly borne in mind that Cost Accounting records are purely statistical—they merely represent a detailed analysis of revenue expenditure as shown by the

DIAGRAM ILLUSTRATING THE TREATMENT OF VARIOUS COST ELEMENTS IN THE COST ACCOUNTS

ELEMENT	ORIGINAL DOCUMENT OR SOURCE	PRIME OR JOURNAL ENTRY	DESTINATION IN COST LEDGER
DIRECT MATERIALS	Invoice, or Stores Requisition	Cost Journal. Materials Abstract	DEBIT Job A/c. CREDIT Direct Materials A/c.
DIRECT STORES	Stores Requisition	Materials Abstract	DEBIT Job A/c. CREDIT Stores A/c.
TRANSFERS OF MATERIALS BETWEEN JOBS	Materials Transfer Note	Adjustment on Materials Abstract	DEBIT Transferee Job A/c. CREDIT Transferor Job A/c.
SURPLUS MATERIALS RETURNED TO STORES	Materials Credit Note	Materials Abstract	DEBIT Stores A/c. CREDIT Job A/c.
TRANSFERS FROM JOBS TO FINISHED STOCK	Finished Stock Transfer Note	Cost Journal	DEBIT Finished Stock A/c. CREDIT Job A/c.
TRANSFERS FROM FINISHED STOCK TO JOBS	Finished Stock Requisition Note	Finished Stock Abstract	DEBIT Job A/c. CREDIT Finished Stock A/c.
DIRECT WAGES	Time Sheet	Wages Abstract. Cost Journal	DEBIT Job A/c. CREDIT Direct Wages A/c.
DIRECT EXPENSES	Invoice or Cash Voucher	Cost Journal	DEBIT Job A/c. CREDIT Direct Expenses A/c.
ONCOST	Estimated Percentage or Rate	Cost Journal	DEBIT Job A/c. CREDIT Oncost Accounts
COMPLETED JOBS	Sales Invoice	Cost Journal	DEBIT Completed Jobs A/c. CREDIT Job A/c.
SALES FROM STOCK	Total of Special Column in Sales Day Book	Cost Journal	DEBIT Sales from Stock A/c. CREDIT Finished Stock A/c.

financial Trading and Profit and Loss Accounts. The " under-recovered " or " over recovered " balances should not, therefore, be carried forward with a view to modifying the expenses chargeable to the products of a subsequent period, as such a procedure would be obviously wrong in principle. Whatever under-absorption or over-absorption may be revealed by the Reconciliation Statement will not affect the amount of the financial profit available for distribution or the amount of the financial loss that may have been incurred.

If the Reconciliation Statement reveals an excessive over-absorption or under-absorption of Oncost, if not due to exceptional circumstances, the question of the rates or percentages of allocation to the various jobs for a subsequent period, must be carefully considered with a view to making an effective revision of such rates or percentages.

Costing Records.

It is advisable at this stage to show the sources of origin of the entries in the Cost Books, how they are dealt with, and their ultimate destination in the Cost Ledgers. As these points have already been dealt with individually in detail in preceding chapters, the information is now given on page 151 in the form of a diagram.

The presentation of this information in this particular form will, it is thought, enable the reader to obtain a better insight into the close relationship between the various documents and accounts necessary for costing purposes. The preceding diagram should, therefore, be studied with particular care and an endeavour made to memorise the information contained therein.

Test Questions

A. It has been stated that an efficient Costing System will not necessarily produce accounts which in their result will agree with the financial accounts. Comment upon this statement.

B. What value do you attach to the reconciliation of Cost Accounts and Financial Accounts? If you find at the end of an accounting period that there are serious differences, where would you expect to locate them, and how would you deal with them in your Cost Accounts?

C. What means would you adopt to obtain agreement between the Cost and Financial Accounts?

D. Enumerate the classes of expenditure, the amounts of which should agree in both the Financial and the Cost Accounts.

E. The net profit as shown in a Cost Ledger Manufacturing Account amounted to £563 17s. 9d., whereas that shown by the Financial Profit and Loss Account amounted to £568 18s. 3d. Would you consider the difference insignificant, or otherwise, for practical purposes? To what cause, or causes, would you attribute the difference between the two results, and what steps would you take to obviate or minimise similar differences in future?

F. Draw a Diagram showing how Direct Expenses and Direct Wages would be dealt with in both the Financial and the Cost Records

G. Are any records made in the Financial Books relating to Transfers of Materials, or Stores, between Jobs and Finished Stock? If so, describe the entries that it is necessary to make.

H. Give the journal entries illustrating the principles of double entry Cost Accounting in respect of:
- (*a*) The payment of wages;
- (*b*) The allocation of oncost;
- (*c*) The issue of goods from stores to a production order; and
- (*d*) The transfer of finished goods to stock.

J. You have been requested to construct a system of Cost Accounts for a manufacturing business. Select a business with which you are familiar, and submit a detailed plan showing the elements of cost in the business you select, suitably arranged in the several stages of costing, and so devised as to dovetail with the financial Trading and Profit and Loss Accounts of the business.

K. What would be the result of the amount of Works Oncost absorbed in the Cost Accounts exceeding the amount of the actual Works Expenses for the same period? What would be the result if the converse position arose? How should under-recovered or over-recovered Works Expenses be treated in the Cost Accounts?

L. It is the practice in a certain factory to charge Oncost to the products by means of pre-determined hourly rates. How would you propose to deal with the following under- or over-absorbed overheads at the end of an accounting period?

	Overhead incurred	Overhead absorbed	Balance
Department A	£2,000	£2,200	+£200
Department B	£1,500	£1,300	−£200
Department C .. .	£1,100	£1,000	−£100

CHAPTER XII

CONTROL ACCOUNTS; CONTRACT ACCOUNTS; PRODUCTION ACCOUNTS

CONTROL ACCOUNTS

It has been observed in the preceding chapter that the Trading and Profit and Loss Accounts in the financial books form a check, or " control," on the Manufacturing Account in the costing books, the nature and extent of any difference between the two sets of accounts being explained in the Reconciliation Statement.

Another form of control is obtained by means of the interlocking system, whereby the actual items of expenditure, as shown by the Financial Accounts, are incorporated in the General Cost Ledger Accounts. In this way it is possible to ensure that all expenditure shown in the financial accounts is accounted for in the Cost Accounts, for any differences are immediately revealed as balances on certain accounts. If this method is applied to the practical exercise set out in Chapter X, the Cost Ledger Manufacturing Account must be dispensed with, the remaining accounts must be modified, while new accounts must be opened as follows:

(*a*) Cost Ledger Control Account;
(*b*) Work-in-Progress Account;
(*c*) Cost of Sales Account; and
(*d*) Stores Ledger Control Account.

Furthermore, the figures shown in the financial accounts must be incorporated in the accounts in the General Cost Ledger. The Job Cost Ledger Accounts will remain as shown in Chapter X, except that they will not be credited with the contract price, but will be treated in a similar manner to the Standing Works Orders Accounts.

The following accounts illustrate how the exercise is worked out under this suggested system of Control Accounts. These accounts should be studied in close conjunction with the detailed accounts set out in Chapter X and the financial accounts referred to in Chapter XI.

With a view to asssisting the reader in following the entries in the accounts set out below, all those items whose source is to be found in the Cost Accounts included in Chapter X are marked (*C*), while those whose source is to be found in the Financial Accounts included in Chapter XI are marked (*F*).

DR CR

Cost Ledger Control Account

19				£	s	d	19				£	s	d
Mch	31	To Cost of Sales A/c (C)		73	7	11	Mch	31	By Stores Ledger				
"	"	" Balance c/d		85	11	5			Control A/c				
									Direct Materials (F)		11	15	-
									Stores (F)		16	15	6
							"		Wages A/c (F)		56	1	-
							"	"	Direct Expenses A/c (F)		2	9	1
							"	"	" Works Expenses A/c (F)		58	-	-
							"		" Office Expenses A/c (F)		13	18	9
			£	158	19	4				£	158	19	4
							"		By Balance b/d		85	11	5

(NOTE.—The debit item £73 7s. 11d. is explained later on page 158.)

DR CR

Stores Ledger Control Account

19	-			£	s	d	19	-			£	s	d
Mch	31	To Cost Ledger Control A/c					Mch	31	By Work in Progress A/c				
		Direct Materials (F)		11	15	-			Direct Materials (C)		11	15	-
		Stores (F)		16	15	6			Stores (C)		16	10	1
							"	"	" Balance c/d		-	5	5
			£	28	10	6				£	28	10	6
Mch	31	To Balance b/d		-	5	5							

DR CR

Direct Expenses Account

19	-			£	s	d	19	-			£	s	d
Mch	31	To Cost Ledger					Mch	31	By Work-in-Progress A/c (C)		2	9	1
		Control A/c (F)		2	9	1							

DR CR

Work-in-Progress Account

19-			£	s	d	19-			£	s	d
Mch	31	To Stores Ledger				Mch	31	By Finished Goods A/c			
		Control A/c						Completed Jobs (c)	52	19	9
		Direct Materials (c)	11	15	–			Works Orders (c)	88	2	2
		Stores (c)	16	10	1	"	"	Balance c/d	18	7	9
"	"	" Wages A/c (c)	56	1	–						
"	"	" Direct Expenses A/c (c)	2	9	1						
"	"	" Finished Goods A/c (c)	2	3	6						
"	"	" Works Oncost A/c (c)	56	1	–						
"	"	" Office Oncost A/c (c)	14	10	–						
		£	159	9	8			£	159	9	8
Mch	31	To Balance b/d	18	7	9						

(NOTE.—The credit items £52 19s 9d. and £88 2s. 2d. are explained later on page 159.)

DR CR

Finished Goods Account

19-			£	s	d	19-			£	s	d
Mch	31	To Work-in-Progress A/c:				Mch	31	By Work-in-Progress A/c (c)	2	3	6
		Completed Jobs (c)	52	19	9	"	"	" Cost of Sales A/c (c)	73	7	11
		Works Orders (c)	88	2	2	"	"	" Balance c/d	65	10	6
		£	141	1	11			£	141	1	11
Mch	31	To Balance b/d	65	10	6						

DR CR

Cost of Sales Account

19-			£	s	d	19-			£	s	d
Mch	31	To Finished Goods A/c (c)	73	7	11	Mch	31	By Cost Ledger Control A/c (F)	73	7	11

DR CR

Wages Account

19-			£	s	d	19-			£	s	d
Mch	31	To Cost Ledger Control A/c (F)	56	1	–	Mch	31	By Work-in-Progress A/c (c)	56	1	–

DR CR

Works Oncost Account

19-			£	s	d	19-			£	s	d
Mch	31	To Cost Ledger Control A/c				Mch	31	By Work-in-Progress A/c (c)	56	1	–
		(Works Expenses) (F)	58	–	–	"	"	Balance c/d	1	19	–
		£	58	–	–			£	58	–	–
Mch	31	To Balance b/d	1	19	–						

DR CR

Office Oncost Account

			£	s	d	19-			£	s	d
Mch	31	To Cost Ledger Control A/c				Mch	31	By Work-in-Progress A/c (c)	14	10	–
		(Office Expenses) (F)	13	18	9						
"	"	" Balance c/d	–	11	3						
		£	14	10	–			£	14	10	–
						Mch	31	By Balance b/d	–	11	3

The following general observations are made by way of explanation of the foregoing accounts.

Cost Ledger Control Account.

This account is debited with the actual cost of sales effected during the period, which, in the present case is represented by the total of the contract prices of the completed jobs and the sales from finished stock, less the respective profits thereon, viz.:

				£	s.	d.
Job. No. 36				40	0	0
Job. No. 42				25	10	0
Finished Stock				40	10	7
				106	0	7
Less Profit on above:						
	£	s.	d.			
Job No. 36	8	2	2			
Job. No 42	4	8	1			
Finished Stock	20	2	5	32	12	8
				£73	7	11

The credit items represent the actual items of expenditure as shown in the Financial Accounts, the corresponding debits being found in the respective "nominal" accounts in the Cost Ledger.

The credit balance on the account (£85 11s. 5d.) should equal the total of the debit balances on the Work-in-Progress and Finished Goods Accounts and, theoretically, all the other accounts should be automatically closed. It will be observed, however, that the balances on the Work-in-Progress Account (£18 7s. 9d.) and the Finished Goods Account (£65 10s. 6d.) amount to £83 18s. 3d., showing a difference of £1 13s. 2d. from the balance on the Cost Ledger Control Account. If a reconciliation of the two figures is effected, it will be found that the difference is accounted for, as shown in Chapter XI, by the debit balances on the Stores Ledger Control Account (5s. 5d.) and the Works Oncost Account (£1 19s. 0d.) *less* the credit balance on the Office Oncost Account (11s. 3d.).

Stores Ledger Control Account.

This account is debited with the purchases of materials effected during the period, as shown in the financial accounts, the corresponding credit being made in the Cost Ledger Control Account. The credit side of the account shows the value of the direct materials and stores issued to jobs and production orders, as computed from the Stores Requisition Notes. The balance of 5s. 5d. represents stores value under-absorbed or undercharged to jobs and production orders.

The balance on the Stores Ledger Control Account should be agreed at frequent intervals with the summary of the balances of the individual accounts in the Stores Ledger.

Direct Expenses Account.

The debit to this account represents the direct expenses incurred during the period as ascertained from the financial accounts, and charged to jobs and production orders, the corresponding credit being made in the Cost Ledger Control Account. The balance of the Direct Expenses Account is transferred to the debit of the Work-in-Progress Account.

Work-in-Progress Account.

This account is debited with the whole of the revenue expenditure on labour, materials and other expenses which have been debited individually to the various jobs, etc., in the Job Cost Ledger, whether such jobs have been completed or not; the corresponding credits are to be found in the respective "nominal" accounts in the Cost Ledger. On the credit side is shown the actual cost of all completed work, whether for customers' orders or works and standing orders, the corresponding debit being made in the Finished Goods Account.

The balance of the Work-in-Progress Account represents the value of all uncompleted work at the end of the period under review.

Finished Goods Account.

The debits on this account represent the cost value of all completed work transferred from the Work-in-Progress Account at the time of closing the books. On the credit side are shown the transfers of any finished stock parts to jobs, etc., which are debited to the Work-in-Progress Account, and the cost value of all sales of finished goods which are debited to the Cost of Sales Account.

The balance of the Finished Goods Account represents the value of finished goods at the end of the period under review.

Cost of Sales Account.

The debit in this account represents the cost price of goods sold, the same amount being credited to the Finished Goods Account. The balance of the Cost of Sales Account is transferred to the debit of the Cost Ledger Control Account.

The selling and distribution expenses may be debited to the Cost of Sales Account, unless they are already included in the Office Expenses Account. If it is desired to include such expenses the necessary entries are effected by a debit to the Cost of Sales Account, and a corresponding credit to the Cost Ledger Control Account, but it is more usual to exclude such expenses from these accounts.

Wages Account.

The debit item on this account represents direct wages incurred during the period, the corresponding credit being in the Cost Ledger Control Account. The balance of the Wages Account is transferred to the debit of Work-in-Progress Account.

Indirect wages are usually included in the Works Expenses Account and Works Oncost Account in the financial and cost books respectively.

Works and Office Oncost Accounts.

The debits on these accounts represent the amounts shown in the financial accounts in respect of works and office expenses, the corresponding credits being made in the Cost Ledger Control Account. The credit items in the two

Oncost Accounts correspond to the debit items in the Work-in-Progress Account, and include oncost on uncompleted work. Thus the Works and Office Oncost Suspense Accounts shown in the accounts in Chapter X have been included in the Works and Office Oncost Accounts set out above.

The debit balance on the Works Oncost Account (£1 19s. 0d.) represents expenditure under-absorbed, or undercharged, to the jobs and production orders, while the credit balance on the Office Oncost Account (11s. 3d.) represents expenditure over-absorbed, or overcharged, to the jobs and production orders.

The balances shown on the Stores Ledger Control Account, Works Oncost Account and Office Oncost Account, can either be brought down as balances on the respective accounts in the hope that they will be automatically adjusted during the ensuing period, or they may be written off to the Cost Ledger Control Account. It is suggested that the latter method should be adopted as it emphasises the loss through excess expenses or short output or the profit through over-estimated expenses or excess output, whereas the adoption of the former method may throw an undue burden on the following period.

After the various accounts have been balanced off, the remaining balances on open accounts in the Cost Ledger will appear as follows:

	Dr. £	s.	d.	*Cr.* £	s.	d.
Cost Ledger Control Account ...				85	11	5
Stores Ledger Control Account ...		5	5			
Work-in Progress Account	18	7	9			
Finished Goods Account	65	10	6			
Works Oncost Account	1	19	0			
Office Oncost Account					11	3
	£86	2	8	£86	2	8

If the balances on the Stores Ledger Control Account, Works Oncost Account and Office Oncost Account are written off to the Cost Ledger Control Account, the open balances will appear as follows:

	Dr. £	s.	d.	*Cr.* £	s.	d.
Cost Ledger Control Account .				83	18	3
Work-in-Progress Account	18	7	9			
Finished Goods Account	65	10	6			
	£83	18	3	£83	18	3

There are other systems of Control Accounts used in actual practice, but the expositions and illustrations given in this and the two preceding chapters, are sufficient to demonstrate the two main systems of double entry Cost Accounting.

CONTRACT ACCOUNTS

Contract Accounts are used in connection with a simple form of Job Costing by contractors in the constructional engineering and building trades, and also by jobbing contractors.

A separate account is opened for each contract, except for contracts and jobs of minor importance, which are dealt with in Sundry (or Miscellaneous) Contracts Account. Exceptionally large contracts, *e.g.*, the construction of a main arterial road, may be sub-divided into separate accounts, the total from each sub-contract account being transferred to the Main (or Master) Contract Account, in which all items are summarised.

These Contract Ledger Accounts are incorporated in the double entry system of financial accounts, and each individual account is drawn up in the form of a combined Trading and Profit and Loss Account. The profit or loss on each contract is transferred to a Profit and Loss on Contracts Account, and the balance on this account is then transferred to the General Profit and Loss Account.

The form of ruling adopted in the Contract Ledger may either be tabulated in a similar manner to the Cost Ledger Job Accounts as shown in Chapter X, or it may be in the form of an ordinary ledger account.

The Contract Accounts are written up as follows:

Debits—

(*a*) Prime cost expenditure, viz., direct materials, labour and expenses actually paid and accrued due.

(*b*) Works oncost on an appropriate basis, *e.g.*, percentage on labour.

(*c*) Office oncost on an appropriate basis, *e.g.*, percentage on works cost (this is often ignored until actual completion of the contract).

(*d*) Value of plant placed on contract, *i.e.*, actual cost price of new plant or depreciated value at date when plant was first used on contract. If the plant is only used on the contract for a short period, an appropriate charge may be debited in respect of the use thereof, *e.g.*, an hourly or daily rate may be adopted.

(*e*) Amounts paid and due to sub-contractors.

Credits—

(*a*) Value of work certified as per architects' or surveyors' certificates.

(*b*) Value placed upon work completed but not yet certified (this should be the actual cost of such work).

(*c*) Direct materials returned to stores plus oncost charged thereon, if any.

(*d*) Value of materials on site not yet consumed.

(*e*) Plant returned to stores, less depreciation.

(*f*) Value of plant still on contract, less depreciation. Alternatively, the net amount of depreciation during the period under review may be debited to the Contract Account, in which case the item (*d*) "Debits" above will not be debited to the account.

The amount of work completed but not yet certified, materials on site not yet consumed and depreciated value of plant on contract, are brought down as the opening debit balances on the account for the ensuing period.

The net balance on the account will represent the estimated amount of profit earned to date and this should be brought down as a credit balance on the account, pending completion of the contract. In the case of large contracts spread over a considerable period, however, it is usual to take a proportion of the profit to the financial Profit and Loss Account (via the Profit and Loss on Contracts Account) in order to avoid undue fluctuations in profits. The proportion of profit transferred to the Profit and Loss Account must be determined after taking the following factors into account:

(*a*) The extent of the advancement of the contract—unless the contract is well advanced the whole of the estimated profit should be carried forward as a reserve, as it is impossible to foresee the future and the estimated profit to date may be eliminated by later losses on the contract.

(*b*) The actual amount of cash received from the contractee on the basis of certificates given by his architect or surveyor as to the value of the work completed to date—normally a certain proportion is kept back as retention money, *e.g.*, 20 per cent., as a safeguard against non-completion of the contract by a certain date, or faulty completion. The proportion of profit transferred to Profit and Loss Account should be correspondingly reduced, thus if only 80 per cent. cash has been received then only 80 per cent. of the proportion of the estimated profit should be taken into account, the balance of 20 per cent. being carried forward as a reserve. The proportion of profit to be taken into account should not be more than two-thirds of the estimated profit; thus, for example, the final amount transferred to the Profit and Loss Account will then be 80 per cent. of two-thirds of the estimated profit, the remaining portion being carried forward as a reserve against future contingencies.

If a loss is shown on the Contract Account, then the whole amount of the loss should be transferred to the Profit and Loss Account, and in any event full provision should be made for any future losses that it is thought will arise, *e.g.*, as a result of labour disputes, increases in material rates, etc.

The usual form and contents of the above-mentioned accounts are shown in the illustration on opposite page.

It will be observed that the amount of profit transferred to the Profit and Loss Account is reduced to two-thirds of the estimated profit, and then further reduced by 20 per cent. of the net figure, as the contractee has only paid cash to the extent of 80 per cent. of the value of the work certified, 20 per cent. having been kept back as retention money.

CONTRACT No. 5

ERECTION OF FACTORY AT HENDON FOR A. CUSTOMER, LTD.

Contract Price, £450,000

Dr.					*Cr.*
19......		£	19 ...		£
Jan.–Dec.	To Direct Materials	49,550	Dec. 31	By Work Certified	310,000
,,	,, Direct Labour	145,600	,,	,, Work Completed but not Certified c/d	24,500
,,	,, Direct Expenses	800	,,	,, Materials on hand at Site c/d	3,200
,,	,, Plant at cost	4,300	,,	,, Plant returned to Stores (less depreciation)	750
,,	,, Works Oncost (50% on Direct Labour) ...	72,800	,,	,, Plant on hand at Site (less depreciation) c/d	2,700
,,	,, Sub-contractors	2,100			
,,	,, Balance, Estimated Profit to date c/d ..	66,000			
		£341,150			£341,150
Dec. 31	To Profit and Loss Account (or Profit and Loss on Contracts Account) — Net Profit transferred (80 per cent. of $\frac{2}{3}$ of £66,000) ...	35,200	Dec. 31	By Balance b/d ..	66,000
,,	,, Balance of Profit c/d .	30,800			
		£66,000			£66,000
19......			19......		
Jan. 1	To Work Completed but not Certified b/d ...	24,500	Jan. 1	By Balance of Profit b/d	30,800
,,	,, Materials on hand b/d	3,200			
,,	,, Plant at Site b/d	2,700			

The personal account of the customer from whom the order was received will appear as follows:

A. CUSTOMER, LTD.

Dr.					*Cr.*
19.		£	19.		£
Dec. 31.	To Contract No. 5 Account ...	310,000	Jan.-Dec.	By Cash ...	248,000
			Dec. 31	,, Balance c/d	62,000
		£310,000			£310,000
19......					
Jan 1.	To Balance b/d ...	62,000			

PRODUCTION ACCOUNT

FOR THE MONTH ENDED 31ST MARCH, 19......

Dr.	£	£		*Cr.* £
To Stock of Raw Materials at 1st March, 19	38,250		By Prime Cost c/d	52,560
,, Purchases of Raw Materials ...	32,100			
	70,350			
Less Stock of Raw Materials at 31st March, 19......	39,000			
Direct Materials Consumed		31,350		
,, Direct Wages . .		20,000		
,, Direct Expenses		1,210		
		£52,560		£52,560
To Prime Cost b/d		52,560	By Works Cost c/d	67,250
,, Indirect Wages		1,340		
,, Works Expenses		11,200		
,, Work in Progress at 1st March, 19 ..	10,250			
Less Work in Progress at 31st Mar., 19......	8,100			
		2,150		
		£67,250		£67,250
To Works Cost b/d... ...		67,250	By Cost of Production ...	72,970
,, Office and Administration Expenses		5,720		
		£72,970		£72,970

PRODUCTION ACCOUNTS

The term Production Account is used to denote a particular form of Manufacturing Account, prepared in conjunction with the financial accounts in order to show the actual cost of producing the goods manufactured during the period under review. These accounts may be drawn up at short intervals, *e.g.*, monthly, the combined totals being incorporated in the final financial accounts at the end of the trading period.

The actual form and composition of a Production Account is evident from the preceding example.

The actual cost of production is carried down to a further section of the account, which is also debited with the stock of finished goods on hand at the commencement of the period plus any finished goods purchased during the period and selling and distribution expenses and credited with the value of the sales effected during the period and the stock of finished goods on hand at the end of the period. The final balance on this section of the account represents the net profit made or the net loss incurred during the period, viz.:

Dr	£	*Cr.*	£
To Stock of Finished Goods at 1st March, 19 . . .	1,500	By Sales . ..	94,000
,, Cost of Production b/d ..	72,970	,, Stock of Finished Goods at 31st March, 19	1,590
,, Finished Goods Purchased	340		
,, Selling and Distribution Expenses	1,050		
,, Balance, being Net Profit for Month	19,730		
	£95,590		£95,590

Alternatively, the above account could be drawn up in the following form in order to show the actual total cost of the sales effected during the period:

	£		£
To Stock of Finished Goods at 1st March, 19	1,500	By Sales ..	94,000
,, Cost of Production b/d .	72,970		
,, Finished Goods Purchased	340		
	74,810		
Less Stock of Finished Goods at 31st March, 19	1,590		
	73,220		
,, Selling and Distribution Expenses . . .	1,050		
Total Cost of Sales	74,270		
,, Balance, being Net Profit for Month	19,730		
	£94,000		£94,000

Test Questions

A. What do you understand by the term "Control Accounts"? Give an example of such an account and explain its functions.

B. What are the advantages and/or disadvantages of keeping (*a*) Cost Accounts as a separate and distinct set of double entry accounts from the Financial Accounts, and (*b*) Cost Accounts and Financial Accounts in an interlocked integral system?

C. Prepare a Stores Ledger Control Account from the following details and state what the balance of the account represents and make any comments you think relevant with regard to the items:—

Stock of Stores at commencement, £896; Deliveries to Storehouse of Goods Purchased, £7,342; Purchases Returned from Storehouse to Suppliers, £115; Materials Charged to Production Orders, £6,153; Direct Sales of Stores, £310; Cost of Stores Sold, £200; Stores Destroyed by Fire and Damaged by Water, £78; Stores Used in the Manufacture of Tools, £53; Appreciation in the Value of Stores, £420; Estimated Waste and Scrap, £96, which was Sold for £28.

D. The following balances appeared in the books of the Roamer Motor Co., on 1st January, 1942:—

	Dr.	*Cr.*
	£	£
Cost Ledger Control Account		14,370
Stores Ledger Account	6,350	
Work-in-Progress Account	4,830	
Finished Goods Account	3,210	
Works Oncost Account		40
Administrative Oncost Account	20	
	£14,410	£14,410

At the end of the year 1942 the following additional balances appeared in the books.—

	£
Purchases of Stores	21,150
Stores issued to Production Orders	23,240
Stores issued to Works Maintenance Orders	920
Wages	33,730
Productive Labour	32,180
Unproductive Labour	1,550
Carriage Inwards (Direct Expense)	450
Works Oncost allocated to Production Orders	9,270
Works Expenses	6,890
Administrative Expenses	1,100
Administrative Oncost allocated to Production Orders	1,250
Goods Completed during the year	65,340
Sales Expenses	750

Record the entries in the Cost Ledger Accounts for the year ended 31st December 1942, and prepare a Trial Balance as at that date.

E. Give an example of a Contract Account in connection with any business to which it is particularly applicable. Also explain how the profit on contracts is estimated and dealt with in the accounts.

F. Theoretically, it may not be correct to bring into account any profit or loss on uncompleted contracts, but in practice strict adherence to this principle may have important consequences. Discuss the pros and cons of this question.

G. A firm of builders, carrying out large contracts, kept, in a Contract Ledger, separate accounts for each contract. On the 30th June 1942, the following was shown as being the expenditure in connection with Contract No. 777:—

	£
Materials purchased	58,063
Materials from Stores	9,785
Plant which has been used on other Contracts	12,520
Additional Plant purchased	3,610
Wages	74,634
Direct Expenses	2,026
Proportion of Establishment Charges ...	8,720

The contract, which had been commenced on 1st February 1942, was for £300,000: and the amount certified by the architect, after deduction of 20 per cent retention money, was £120,800, the work being certified on 30th June 1942. The materials on the site at that date were valued at £9,858. A Contract Plant Ledger was also kept, in which depreciation was dealt with monthly; the amount debited in respect of plant on Contract No. 777 to 30th June 1942, was £1,130.

You are required to prepare an account showing the profit on the contract to 30th June 1942.

H. From the following figures you are required to prepare a Production Account for the quarter ended 31st December 1942, assuming Stock of finished goods at end of period to be valued at cost, showing—

(*a*) The value of Materials Consumed;
(*b*) Cost of Production;
(*c*) Cost of Stock sold;
(*d*) Profit on Stock sold.

	At 1st October	At 31st December
Stock:	£	£
Raw Materials	20,000	24,700
Finished Goods	14,300	8,400
Work in Progress	6,200	6,900

	£
Purchases of Raw Materials	17,600
Direct Wages	14,000
Indirect Wages	500
Works Charges	7,400
Administrative Expenses	2,600
Selling Expenses	3,000
Sales	56,800

J. A shipbuilding company has built a tug for its own use. The costing records show the cost of direct labour and materials. In arriving at a figure for the purposes of capitalising the tug, should works and/or office oncost be added to the charges already recorded? Give reasons for your answer.

CHAPTER XIII

COSTING METHODS OTHER THAN JOB COSTING

General Considerations.

The preceding chapters have been devoted mainly to a detailed consideration of the principles and practice of Costing as applied to Job Costs in particular. These aforementioned principles, however, apply equally to other costing methods, *e.g.*, the Process or Departmental Costing methods, which only differ from the Job Costing method in relation to the standard unit adopted as a costing basis. Process, Output, Multiple, and Operating, Working, or Running Costs are much simpler than Job Costs owing to the fact that the processes, stages, or departments are limited in number, whereas the number of jobs, for which the cost of production must be separately ascertained, invariably runs into hundreds and possibly thousands.

The typical businesses, to which the various methods of costing apply, have already been indicated in Chapter II.

Cost Sheets.

Where the costing records are kept under methods other than those of Job Costing, the results are shown in the form of *Cost Sheets.* These sheets are compiled periodically, either weekly or monthly, according to the requirements of the particular business. The exact form of such sheets will vary in accordance with the particular costing method adopted and the individual circumstances of the business concerned. The term "Cost Sheet" is usually confined to a statement showing the actual expenditure upon the production of a specified period; if the statement records this information and details of opening and closing stocks and sales and profit or loss thereon, it is usually termed a " Sales Production Account."

In constructing a Cost Sheet, the whole of the expenditure is obtained for a given process, for a given quantity, or for a definite period of time (week, month, or quarter), and columns are provided for the purpose of showing the expenditure for previous processes, or previous periods of time, in order that comparisons may be facilitated. The totals of these sheets are usually summarised at the end of a trading period in order to facilitate reconcilation with the financial accounts.

It is almost impracticable to give specimens of Cost Sheets used in actual practice, as such sheets are usually of very large dimensions, and some contain elaborate analytical columns, but the illustrations given later in the chapter indicate briefly the essential details and the manner in which the various items are arranged.

In the following paragraphs a brief summary is given of the principal features of these additional costing methods, specimen cost sheets being shown for purposes of illustration. It should be noted that the figures in the various specimen cost sheets have been inserted to complete the illustrations, and they are not to be taken as indicative of current costs in the various types of concerns to which the cost sheets refer.

Process Costing.

As mentioned in Chapter II, this method of costing is applicable to industries that produce the finished material by means of a series of processes, or stages, in any of which processes, or in the finished state, it would be impossible to trace prime cost expenditure to a given order. Thus, in such an industry, the same product is produced continuously, and each specific order becomes merged in the whole volume of production without retaining its individual identity.

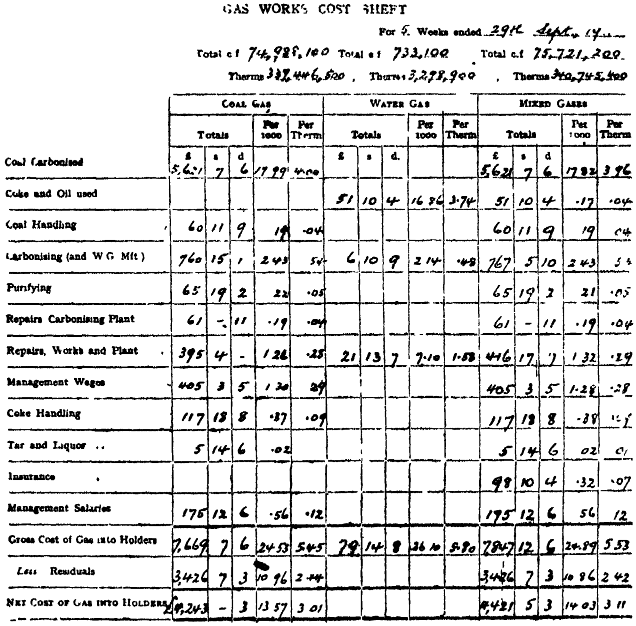
The essential principle in this method of costing is that each separate process or operation should be considered as a separate department, the various items of direct expenditure and proportion of oncost being debited to the particular process concerned. Each process is credited with its output at cost price or at certain fixed prices, *e.g.*, at the current market value at that stage of production or at cost price plus

CHEMICAL PROCESS COST SHEET

Week ending: 4th March, 19..

Output : Tons, 100.

	Totals			Cost per ton		
	£	s.	d.	£	s.	d.
Materials	975	-	-	9	15	-
Process Haulage	25	10	-		5	1·2
Process Labour	220	-	-	2	4	-
Process Fuel	77	10	-		15	6
Water	5	-	-		1	-
Steam and Steam Power .	30	-	-		6	-
Air						
Electricity	17	10	-		3	6
Rubbish Disposal						
	1,350	10	-	13	10	1.2
Process Supervision	80	-	-		16	-
Miscellaneous Stores used on Process	30	-	-		6	-
Repairs and Renewals	10	10	-		2	1·2
Provision for obsolescence (8%)	7	10	-		1	6
	1,478	10	-	14	15	8·4
Deduct Transfers to other A/cs.						
PROCESS COST ..	£1,478	10	-	14	15	8·4



GAS WORKS COST SHEET

For 5. Weeks ended 29th Sept. 14

Total c.f 74,988,100 Total c.f 733,100 Total c.f 75,721,200

Therms 337,446,500 , Therms 3,298,900 , Therms 340,745,400

	Coal Gas					Water Gas					Mixed Gases				
	Totals			Per 1000	Per Therm	Totals			Per 1000	Per Therm	Totals			Per 1000	Per Therm
	£	s	d			£	s	d.			£	s	d		
Coal Carbonised	5,621	7	6	17 99	4·00						5,621	7	6	17 82	3 96
Coke and Oil used						51	10	4	16 86	3·74	51	10	4	·17	·04
Coal Handling	60	11	9	19	·04						60	11	9	19	·04
Carbonising (and W G Mit)	760	15	1	2 43	54	6	10	9	2 14	·48	767	5	10	2 43	54
Purifying	65	19	2	22	·05						65	19	2	21	·05
Repairs Carbonising Plant	61	–	11	·19	·04						61	–	11	·19	·04
Repairs, Works and Plant	395	4	–	1 26	·28	21	13	7	7·10	1·58	416	17	7	1 32	·29
Management Wages	405	3	5	1 30	29						405	3	5	1·28	·28
Coke Handling	117	18	8	·37	·09						117	18	8	·38	·09
Tar and Liquor ..	5	14	6	·02							5	14	6	02	01
Insurance											98	10	4	·32	·07
Management Salaries	175	12	6	·56	·12						175	12	6	56	12
Gross Cost of Gas into Holders	7,669	7	6	24 53	5 45	79	14	8	26 10	5·80	7847	12	6	24·89	5 53
Less Residuals	3,426	7	3	10 96	2 44						3,426	7	3	10 86	2 42
NET COST OF GAS INTO HOLDERS	£4,243	–	3	13 57	3 01						4,421	5	3	14 03	3 11

an agreed percentage. Where the market price or a price in excess of cost is taken, the management can ascertain the profit or loss at each stage of manufacture and determine whether it would be more profitable to obtain partly-processed material from an outside source. This cost price or fixed price is then debited to the succeeding process, and so on. Thus the completed output of one process may be considered as being the raw material of the next process, and so on, until the ultimate product is obtained. An example of such Process Accounts will be found on page 176.

Particular attention should be paid to the valuation of work in progress as such valuation will have a decided effect upon the computation of profits particularly where each process is credited with its output at a price in excess of cost for such unrealised profits must be eliminated in the valuation of work in progress.

In connection with Process Costing, the question of *By-Products* (or *Residuals*) usually has to be taken into consideration. Separate accounts must be kept of these

OIL REFINERY PROCESS COSTING ACCOUNTS

Week ended 30th Sept, 19-

Process A - Copra Crushing

	TONS	£		TONS	£
To Copra Purchased	500	20,000	By Crude Oil to Process B	300	19,400
" Labour		250	" Sale of Copra Sacks	—	40
" Electric Power		60	" Sale of Copra Residue	175	1,100
" Sundry Materials		10	" Wastage	25	—
" Repairs to Machinery					
and Plant		28	(Cost per ton of Crude		
" Steam		60	Oil = £64 13s 4d)		
" Factory Expenses		132			
	500	£20,540		500	£20,540

Process B - Refining

	TONS	£		TONS	£
To Crude Oil from			By Refined Oil to Process C	250	19,205
Process A	300	19,400	" By-Products	45	675
" Labour		100	" Wastage	5	—
" Electric Power		36			
Sundry Materials		200			
" Repairs to Machinery			(Cost per ton of Refined		
and Plant		33	Oil = £76 16s 4.8d)		
" Steam		45			
" Factory Expenses		66			
	300	£19,880		300	£19,880

Process C - Finishing

	TONS	£		TONS	£
To Refined Oil from			By Casked Oil	248	20,210
Process B	250	19,205	" Wastage	2	—
" Labour		150			
" Electric Power		24			
" Repairs to Machinery			(Cost per ton of Casked		
and Plant		14	Oil = £81 9s 10.06d)		
" Steam		45			
" Factory Expenses		22			
" Casks		750			
	250	£20,210		250	£20,210

by-products; each Process Account being credited with the current market value of the by-products (less any selling expenses necessarily incurred in the disposal of the by-products) derived from that particular process, the same value being debited to the appropriate By-Product Account.

COMPOSITE COST SHEET
OF IRON FOUNDRY PRODUCTS
ENAMELLED AND MACHINED

Week ending *15th August*, 19 ..

	Quantity	Weight			Rate						
MATERIALS		C.	Q.	L.	per cwt.	£	s.	d.	£	s.	d.
Melted Iron	50	20	0	0	9/4				9	6	8
Enamel			1	22	per lb. 3*d.*					12	6
Sundry Fitting Materials .									1	6	4
									14	5	6
PRODUCTIVE WAGES											
Moulding	50				each **2/2**	5	8	4			
Dressing	50				each 4*d.*		16	8			
Enamelling:											
Annealing	50						13	0			
Sandblasting . ..	50						2	9			
Putting-on Enamel ...	50					2	12	6			
Fitting: *Machining*	50					6	13	0			
Assembling ...	50					2	10	0			
Testing ...	50						12	0			
Painting	50						3	0	19	11	3
									33	16	9
Process Expenses											
Moulding Shop . .						6	1	0			
Dressing Shop							12	0			
Putting-on Enamel ..					}	5	15	0			
Annealing											
Sandblasting						1	12	9			
Fitting Shop . .						10	4	0	24	4	9
									58	1	6
General Productive Expenses									3	2	6
Waste: *Casting* .						1	14	0			
Enamelling ..						2	17	6	4	11	6
									£65	15	6

Where the by-product is utilised as raw material for another process, or there is no market value upon which to base the price of such by-product, an estimated figure must be used based upon the cost of the process in which the by-product was produced. Wastage often arises in Process Costs, and normal wastage is merged into the Process Account concerned by the automatic reduction of the effective units produced, *e.g.*, tonnage, thus increasing the cost of each unit in that process. If the wastage has a saleable scrap value, then such value is credited to the Process Account concerned.

In addition to the actual Process Accounts, cost sheets are periodically compiled in order to ascertain the actual cost per unit of output for the particular period under review, as illustrated on page 179.

Single (Output) Costing.

This method of costing is applicable to those concerns that

COLLIERY COST SHEET

Week ending 10th March 19..

Output: Tons. 20,000 Totals Per ton

		Totals				Per ton	
Wages.		£				s.	d
Underground. Coal getting		3,333	-	-		3	4
Haulage ..		708	-	-			8·5
Repairs ..		559	-	-			6·7
Surface: Washers.. ..		67	-	-			·8
Other Workers		2,833	-	-		2	10
		7,500	-	-		7	6
Working Expenses:							
Timber and Pitwood ..		375	-	-			4·5
Repairs and Renewals ..		667	-	-			8
Mine Rent		166		-			2
Royalties and Wayleaves..		375	-	-			4·5
Workmen's Compensation		234	-	-			2·8
Depreciations		433	-	-			5·2
General Expenses.. ..		542	-	-			6·5
Management Charges ..		192	-	-			2·3
Administrative Expenses:							
General Administration Charges		350	-	-			4·2
Selling and Distribution Expenses		166	-	-			2
TOTAL	£	11,000		-		11	0

produce a uniform product which can be taken as a basis for costing purposes. The object of Single Costing is therefore to ascertain the total cost of the output for any given period, and the detail cost per unit of output, *e.g.*, per sack of flour in a flour mill; per ton of saleable coal raised in a colliery, etc. This method of costing does not call for the detailed analysis and allocation required in Job Costing; the

STEEL RE-ROLLING MILL

COST SHEET

Month ending 30th April 19..

t c q lbs Output 2,302 19 3 -	A/c No.	Totals £	s.	d.	Per ton £	s.	d.
Raw Materials :							
Steel Billets		14,810	18	9	6	8	7·48
Steel Blooms							
Furnace, or Gas Producer Fuel		396	18	-		3	5·35
Labour :							
Cutters Down and Deliverers to Furnace ..		73	5	2			7·63
Gas-Producer Men ..		43	18	1			4·58
Furnace Chargers		20	17	8			2·18
Heaters		129	7	3		1	1·48
Rollers		687	14	8		5	11·67
Mill Floormen		250	4	-		2	2·06
Mill Foremen, Stocktakers and Warehousemen ..		67	3	1			7·00
Mill Power and Lighting ..		345	9	-		3	-
Mill Oncost		917	14	2		7	11·62
Office Oncost		403	-	6		3	6 00
GROSS COST OF PRODUCTION		18,146	10	4	7	17	7·05
Less value of Scrap accrued		287	16	3		2	6·00
NET COST OF PRODUCTION ..	£	17858	14	1	7	15	1·05

essentials being a careful sub-division of labour, materials, and other expenditure into their respective classes. This information can be obtained direct from the various Nominal Accounts in the financial books, or from the completed Trading and Profit and Loss Accounts, the cost per unit being ascertained by dividing each item of expense by the output in units for the period under consideration. Where necessary, the information shown in the financial accounts must be analysed to meet the requirements of the costing system, for example, direct materials must be separated from indirect materials by a careful dissection of the purchases in the financial accounts. The necessary adjustments in respect

BRICK WORKS COST SHEET

Production : Month ended 30th April 19.. 45,000 Bricks

		Totals			Cost per 1000		
Wages .	A/c. No.	£	s.	d.	£	s.	d.
Clay Getting		31	5	.		13	10·66
Making & Pressing (Bricks)		28	2	6		12	6·00
Kilning		18	15	-		8	4·00
Loading and Stacking ..		18	3	9		8	1·00
Transporting		4	18	-		2	2·13
Materials :							
Coal Dust and Oil ..		30	10	6		13	6·80
General Stores		13	15	9		6	1·53
Expenses :							
Management & Supervision		20	10	-		9	1·33
Rent, Rates and Taxes ..		4	7	6		1	11·33
National Insurance ..		1	15	6			9·46
Workmen's Compensation		2	-	-			10·66
Depreciations			15	.			4·00
Office Expenses :		16	17	6		7	6·00
COST OF PRODUCTION	£	191	16	-	4	5	2·90

of expenses outstanding or paid in advance, materials or stores not yet consumed, etc., must be made to ensure that each item of expense relates solely to the period under review. In this way comparisons in costs per unit can be made between different periods, and any marked variations enquired into, and for this purpose comparative figures of other corresponding periods can be inserted in additional columns on the cost sheet, while cumulative totals can also be appended to show the detail cost of the total production for the financial accounting year to date. Records should also be kept of quantities consumed in order to ascertain the percentage of waste.

Multiple Costing.

This method of costing is utilised where the articles, etc., manufactured are of a varied nature having little or no relation to one another, and passing through a varied sequence of processes and operations, *e.g.*, cycle accessories. The Job Costing method cannot be applied to this type of business, as the division of the products into separate jobs would not be practicable and would, incidentally, involve considerable expense in the compilation of the costing records. To overcome this difficulty the products of the factory are divided into general groups or classes, the items of prime cost being allocated accordingly and debited against their respective groups. Oncost requires particular attention. Under this costing method, varying percentages are adopted for oncost purposes, such percentages being dependent upon the nature of the labour utilised in each specific group. It is customary to obtain expert advice in fixing oncost rates in businesses of this nature.

The cost sheets are drawn up in a similar manner to Output Cost Sheets, a separate sheet being compiled for each group or series of articles, on a departmental basis.

Operating Costing.

This method of costing is utilised in the case of those undertakings where services are rendered rather than goods

ELECTRICITY WORKS COST SHEET

For Month ended *31st March 19..*

No. of Units Sold: *1,162,829.*

	Totals			Per Unit
Wages:	£	s.	d.	d.
Generating	387	12	2	·080
Repairs and Maintenance:				
Power House Buildings	19	7	7	·004
Engines	33	18	3	·007
Boilers	24	4	6	·005
Dynamos, Exciters, Transformers, Motors, etc.	29	1	4	·006
Other Machinery, Instruments, Plant and Tools	9	13	9	·002
Accumulators and Accessories	29	1	8	·006
	532	19	3	·110
Materials (Stores Issued):				
Generation:				
Coal, or other Fuel	1,114	7	6	·230
Oil, Waste and Engine Room Stores ..	19	7	7	·004
Water	29	1	4	·006
Repairs and Maintenance				
Power House Buildings	48	9	4	·010
Engines	48	9	-	·010
Boilers	96	18	3	·020
Dynamos, Exciters, Transformers, Motors, etc.	339	3	2	·070
Other Machinery, Instruments, Plant and Tools	193	16	-	·040
Accumulators and Accessories	242	5	1	·050
Cost of Generation*	£2,664	16	6	·550

* Exclusive of Management Exs., Rates, Taxes, Insurance, Salaries, etc.

N.B.—Total amounts under each heading are approximate. The "analyses of amounts" under Repairs and Maintenance are fictitious.

produced and it is applicable to the majority of public utility concerns, *e.g.*, tramways, railways, electric power stations, etc. The costs are based upon a well-defined unit, as in the case of Single Costs, *e.g.*, the car-mile, the train-mile, the Board of Trade unit, etc. The financial accounts provide the necessary data for costing purposes, the cost per unit being ascertained by dividing the total units for a specified period into the various items of adjusted expenditure for the same period.

In the case of *Motor Haulage* concerns, the costs are divided into two main sub-divisions:

(*a*) Standing Charges, *e.g.*, insurance, motor tax, etc.; and

(*b*) Running Costs, *e.g.*, petrol, oil, etc.

The actual costing units may consist of any of the following:

(*a*) Cost per mile, by dividing the total cost by the number of miles travelled, whether the vehicles are loaded or not.

(*b*) Cost per absolute ton-mile, by multiplying the number of miles travelled by the number of tons carried for that mileage and dividing the resultant figure into the total costs —this method is adopted where one load is carried throughout the total journey.

(*c*) Cost per commercial ton-mile, as in (*b*) but by dividing the resultant mileage by two—this method is adopted where portions of the loads are delivered at different stages on the route and other portions are picked up en route.

(*d*) Cost per ton, by dividing the total costs by the number of tons carried, irrespective of mileage.

(*e*) Cost per double-journey, or per trip.

Departmental Costing.

Where two or more clearly-defined articles are produced it is advisable that the activities of the business be divided into corresponding departments, separate records being kept of the expenditure in respect of each individual department. The division into departments may be determined in various ways, *e.g.*, according to the nature of the materials used, the labour employed, etc. The various items of direct ex-

MOTOR HAULAGE COST SHEET

For Week ending 30th April, 19..

Lorries					Standing Charges																					Running Costs.															Gross Totals			Mileage and Tonnage			Unitary Costs & Data				
No.	Make	Wages			Deprecn.			Repairs			Rent			Insurance			Licences and Tax			Interest			Totals			Tyres			Petrol			Oil			Sundries			Totals			Standing and Running			Mil'ge	Tons Carr'd	Ton Miles	Cost per Ton		Cost per Ton Mile		Petrol m.p.g.
		£	s.	d.	£	s.	d.	£	s	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s	d.	£	s	d.	£	s	d.	£	s.	d.	£	s	d				s	d.	s.	d.	
1	"Commer"	5	2	6	3	-	-		7	6		10	-		16	6	1	5	-		16	8	11	12	2		6	3	2	10	-		4	6		3	6	3	4	3	14	16	5	650	83	3250	3	6·96		1·00	12
2	"Dunlop"	4	10	-	2	5	-					10	-		10	6	1	-	6		11	6	9	7	6		5	·	1	15	-		4	-		2	3	2	6	3	11	13	9	630	61	2520	3	9·98		1·11	14
3	"Ford"	3	15	-	1	7	6		5	6		10	-		10	6		18	9		7	3	7	14	6		2	6	1	5	-		3	6		1	8	1	12	8	9	7	2	500	70	1000	2	8·04		2·25	16
	£	13	7	6	6	12	6		13	-	1	10	-	1	11	6	3	4	3	1	15	5	28	14	2		13	9	5	10	-		12	-		7	5	7	3	2	35	17	4	1,780	214	6,770	3	4·22		1 26	-

penditure, *i.e.*, prime cost, should be debited to the departments concerned, provision being made for transfers of material from one department to another. The works expenses should be apportioned over the various departments on an equitable basis, particular care being taken that any one department is not charged with items of indirect expenses that do not relate to that particular department. It is usually found advisable to allocate general works oncost in the ratio of the direct labour of each department.

Test Questions

A. Draw up a specimen Cost Sheet setting out the different items of expenditure in connection with any product with which you are acquainted. State the name of the product at the head of the sheet.

B. Describe the objects of Cost Sheets, and give an example applicable to a Cloth Manufacturer or other business known to you.

C. Discuss the statement that "Comparisons enable costs to be controlled."

D. Select an industry and set out, as fully as possible, a form of final cost and include therein sufficient information to permit of a selling price being obtained.

E. How should by-products be dealt with in the Cost Accounts where:

(*a*) The by-product is of little value;
(*b*) The by-product is of considerable value?

F. Explain whether it is important to make records of losses that occur in processes from a costing standpoint

G. From the following figures prepare a *pro forma* Cost Sheet showing the results of the operations:

Vitriol used 225 tons costing £5 per ton.
Fuel ,, 20,700 ,, ,, £1 ,,
Oil ,, 4,620 gallons ,, 1s. 2d. per gallon.
Wages £4,200.
Sundry Expenses £480.
Coke produced 14,100 tons at 30s. per ton.
Tar ,, 1,675 ,, 100s ,,
Toluol ,, 168 ,, 40s. ,,

H. From the undermentioned figures prepare Process Accounts indicating the cost of each process and the total cost. The production was 480 articles per week.

	Process I	Process II	Process III
	£	£	£
Materials	3,000	1,000	400
Labour .	1,600	4,000	1,200
Oncost Expenses	520	1,440	500

Indirect expenses amounting to £1,700 should be apportioned on the basis of wages. Ignore Stocks on hand and work in progress at the beginning and end of the week.

J. In some classes of industries it is possible to arrive at costing figures from the ordinary accounting system either with or without amplification, and without keeping a separate set of books. Explain how the financial records of a Colliery should be arranged and give the necessary costing information, and illustrate by a draft form a Cost Sheet showing analysis of Underground and Surface Wages, Working Expenses (in detail) and Administration and Establishment Charges.

K. An Ironmaster produces 40,000 tons of pig iron in a year at certain furnaces. From the following figures prepare a Production Cost Sheet, showing the cost per ton of the various items of expenditure, and after allowing for £16,000 in respect of the amount received for the sale of slag, show the cost per ton of pig iron produced.

	Stocks at beginning of year.	Purchases during year.	Stocks at end of year.
	£	£	£
Coal .	9,500	40,000	8,000
Coke .	7,300	57,000	6,500
Limestone	3,000	12,000	3,500
Ironstone	8,200	35,000	6,400
Sundries	5,600	16,000	6,000

Works General Charges are to be taken as £9,500 and Wages as £35,000.

L. From the following information prepare a monthly Cost Sheet of the Sand-Lime Brickworks, showing cost and profit per M bricks. (Note: M = 1000.)

Materials used: Lime—895 tons at 50s. per ton.
Coal—820 tons at 30s. per ton.
Sand—1s. per M bricks made.
Stores—£632 10s.
Labour: Sand Digging and Running, £500.
Brick-making, £2,000.
Works Oncost: 25% of Direct Charges
Office Oncost: 10% of Works Cost.
Bricks Sold: 3,500 M at 55s. per M.
Stock of Bricks at beginning of month: 100 M.
Stock of Bricks at end of month: 600 M

M. Describe a system of Operating Costing which you would recommend for use in a Motor Haulage business, illustrating your answer with such statements or records as you would advise should be kept.

N. A large store maintains a fleet of motor-lorries for delivery purposes. Prepare a statement showing the costs of working in the manner in which, as accountant to the company, you would present them to the directors. You may supply for the purpose any figures or other information you think necessary.

O. Explain fully what you understand by the following terms as applied to Motor Haulage undertakings: Running Costs, Standing Costs and Commercial Ton-Mile; and state the advantages and disadvantages of using the following units for comparing the operating costs of road transport: (*a*) per ton, (*b*) per mile and (*c*) per ton-mile.

CHAPTER XIV

UNIFORM COSTING; STANDARD COSTING; BUDGETARY CONTROL

Uniform Costing.

There is a growing tendency in many industries to adopt a scheme of Uniform Costing. Uniform Costing is not a different method of costing from those which have already been explained, but a uniform manner of applying the principles of the method, or combination of methods, of costing most suitable to a particular industry, where the manner of application is agreed upon and adopted by a number of concerns in that industry.

For example, consider any specific industry, say, the manufacture of steel tubes, in which the Single (or Output) method of Costing is accepted as the most suitable one. The manufacturers in that industry may come to an agreement on the procedure in compiling the costing data, with a view to ascertaining the cost of production and the fixing of standardised selling prices. Among the chief points to be considered in order to arrive at a uniform procedure are the following:

(*a*) Departmentalisation;
(*b*) Methods and rates of workers' remuneration;
(*c*) Nature and extent of items of expenditure comprising Prime Cost and Oncost, respectively;
(*d*) Principles of allocation of Oncost;
(*e*) Treatment of interest on capital and the assessment of rates of depreciation; and
(*f*) Standardised selling prices.

The main objects of adopting Uniform Costing are:

(*a*) To eliminate useless and destructive competition;
(*b*) To improve the conditions involved in the processes of manufacture; and
(*c*) To standardise selling prices.

Uniform Costing is an economic necessity where manufacturing concerns and businesses are amalgamated and controlled by a holding company, otherwise it would be impossible to compare the cost per unit of production and the degree of efficiency of the respective businesses in the complete organisation. A scheme of Uniform Costing is also essential in cases where groups of businesses in a particular industry are federated, or associated, for the purpose of regulating selling prices, and for the proper functioning of such organisations. An outstanding example is that of the costing procedure formulated by the British Master Printers' Federation.

The time is rapidly approaching when each industry, including public utility undertakings, will find it not only convenient but necessary to adopt standardised principles of compiling costing data.

Many manufacturers outside the existing amalgamations, federations and associations are reluctant to discuss the principles of costing data with their competitors, through fear of disclosing secret processes of manufacture, or of making public property of the details of their organisations and methods of production, for they attribute their success to the personal possession of this information. There is no valid reason, however, why such manufacturers should not benefit by the adoption of uniform principles of procedure in costing methods as regards:

(*a*) Methods and rates of workers' remuneration;
(*b*) Principles of allocation of Oncost; and
(*c*) Maximum cost per unit of production.

It is beyond the scope of this book to give a detailed account of the procedure in the compilation of costing data for every particular industry, for the main object of this treatise is to provide the reader with a clear and concise explanation of the essential principles underlying all systems of costing.

Standard Costing.

The manufacturer, or executive, is able to determine the total cost of production from the actual costing data, thus he is in a position to compare the results with those of previous corresponding periods. The information so obtained, however, does not enable him to determine with scientific precision what the efficiency of his business should be, as he is not in a position to control the expenditure on the various agents of production as and when such expenditure arises.

The maximum degree of efficiency, which may be represented by the index figure 100, can be determined only by an exhaustive analysis of past costing data, and the careful consideration of all the conditions pertaining thereto. In other words, a schedule of the items of expenditure incurred under normal conditions and representing the highest degree of efficiency already obtained is compiled. The schedule shows what may be taken to be, for the time being, the ideal cost of the maximum production.

The information thus obtained is termed the *Standard Cost of Production*, and although, in a sense, such information would be artificial and unsuitable, without modification, as a basis for quoting selling prices, it forms a valuable basic guide with which actual costs can be compared and the various operations and processes tested. For the individual items on the schedule represent that which has been effected and which under similar conditions should be capable of repetition and, possibly, of improvement. In this way the executive can be informed of the actual extent of variations from the ultimate standard cost, thus enabling such variations to be investigated without undue delay.

In order to facilitate comparison, *Index*, or *Ratio*, *Figures* are employed, the Standard Costs being taken as 100. For example, if the indirect wages as shown in the actual costs are £7,490, whilst the standard costs are estimated at £7,000, then, other conditions being equal, the index figure for the actual costs would be 107 as against 100 in the standard costs. In other words, it may be said that the actual costs represent a percentage efficiency of 91.45 as compared with the standard costs. Thus the discrepancy may be investigated without delay, for it may be due to increased labour rates, overtime, excessive idle time, or general labour inefficiency.

An index figure below 100 in the actual costs indicates the relatively higher degree of efficiency with regard to the particular items of expenditure, while, conversely, an index figure above 100 indicates a corresponding degree of inefficiency.

When comparing the actual costs with the standard costs, it will, of course, be necessary to take into consideration any deviation from normal working conditions and any other factors affecting the variation of the index figures, viz.:

(*a*) Alterations in the cost of material and labour rates;
(*b*) Breakdowns in machinery and stoppages due to any abnormal causes; and
(*c*) Effects of supernormal and subnormal volumes of production on items of fixed oncost.

It is not practicable to make use of Standard Costs in every industry. They may be adopted with advantage where the production consists of a repetition of similar articles or processes, *e.g.*, the manufacture of nuts and bolts or the production of chemicals or artificial foodstuffs. Where, however, the work performed is of a non-repetitive nature, *e.g.*, house construction, the compilation of Standard Costs would involve intricate computations and an amount of clerical labour and expense out of all proportion to the advantages obtained.

Budgetary Control.

Where Standard Costing is adopted it is advisable to employ a system of Budgetary Control as an additional aid in comparing actual expenditure with standard expenditure.

The institution of a system of Budgetary Control involves the preparation of a schedule of budgetted items of expenditure, which it is estimated will be incurred in connection with an assumed volume of production during an immediate future period. The assumed volume of production is estimated on the basis of the expected volume of sales for the period, after taking into consideration every known factor that may influence the amount of future sales, as the volume of production will tend to vary with the volume of sales. Having determined the volume of production, the expenditure required for such a volume of production is forecasted and set out in the form of a schedule, which should show the expenditure in detail under classified heads in accordance with the constituent items of total cost.

The actual production and expenditure should be compared with the budgetted production and expenditure at frequent intervals, say, weekly or monthly, and any increase or decrease should be enquired into, while similar attention should be paid to the cumulative total of actual and budgetted expenditure from the commencement of the financial accounting period to the end of the particular week or month under review.

Alternative budgets of expenditure can be prepared for varying volumes of production, so that where the production increases or decreases as compared with the expected volume of production, the actual expenditure can then be compared with the forecasted expenditure set out in the appropriate alternative budget.

Test Questions

A. What is meant by Uniform Costing? What advantages would you expect to accrue from the institution of a uniform system of costing throughout an industry?

B. Enumerate as fully as you can the objections raised by certain manufacturers to any scheme of Uniform Costing and state your replies to such objections.

C. A holding company controls three factories, all of which make similar products. It is desired to introduce a system of Uniform Costing in the three factories. Describe briefly the principles on which you would base the system you would propose to install.

D. A, B, and C, three manufacturers, producing 70 per cent. of the output of a given industry, adopt agreed uniform costing methods. The net profits are, however, found to be: A, 10 per cent. on sales; B, 9 per cent.; and C 4 per cent. How should C proceed in reviewing his methods, and the marketing of his goods, in order to ascertain the inefficiencies which are handicapping him so seriously?

E. If a system of uniform costing were adopted by all, or the majority, of the manufacturers in a given industry, would it have any effect on competition in that industry? Give reasons for your answer.

F. What do you understand by Standard Costs? To what industries or classes of products do you consider them applicable? How are they compiled and how are they used to reflect efficiency in manufacture?

G. Explain the significance of Standard Costs as compared with Actual Costs and show how they are applied and what information is obtained from their application.

H. It has been said that " Standard Costs are artificial costs " Explain this statement and state under what conditions Standard Costs should be modified from time to time.

J. How would you treat the following as to their effect on Standard Costs?

(*a*) Exceptional expenditure. *e.g.*, abnormally large and expensive repairs due to explosion or flood and not covered by insurance.

(*b*) Prolonged periods of overtime.

K. Define the term " Budgetary Control " and state fully what are its advantages as applied to costing.

L. In drawing up a scheme of Budgetary Control, what considerations should be taken into account, and how should they be provided for?

M. What do you understand by the following terms?

(*a*) Ratio Figures.

(*b*) Pre-determined Costs.

(*c*) Budgetted Expenses.

(*d*) Alternative Budgets.

CHAPTER XV

GRAPHS AND CHARTS FOR EXECUTIVE CONTROL

Advantage of Graphs and Charts.

A modern development applied to costing records is the increasing utilisation of *Graphs* or *Charts* as a means of presenting comparative costs and percentages in a useful and informative manner. For example, when it is necessary to report to the management of a technical firm, it is found that the required statistical information can be more readily conveyed by the use of a graph constructed on squared paper, than by the presentation of a series of columns of figures. Furthermore, it is found that this method will give a clearer mental picture of the figures and thus will overcome the objection that technical men have to the use of non-explanatory figures.

A variation in the amount of any particular class of expenditure, the fluctuation in output, etc., is not so well emphasised by the presentation of a column of figures nor is the tendency of the fluctuation so well indicated as where an intelligent use is made of graphs. The tendency towards variation which is concealed in the figures is readily shown when the figures themselves form the basis of a clearly constructed graph.

Construction of Graphs and Charts.

In constructing a graph or chart it is absolutely essential that the figures be accurate, and that the degree of accuracy be clearly indicated. Round figures may be utilised as far as possible provided the margin of approximation is not too great, and where it is considered advisable to show fractional amounts, it is usually permissible to approximate to two places of decimals.

Comparative graphs or charts must, of course, be absolutely uniform in construction—the spaces between the figures and between periods must be exactly equal, otherwise the graphs or charts will be misleading and useless.

Furthermore, it is essential that particular attention should be paid to the classification of items, *i.e.*, that the records of each period be prepared on similar lines, otherwise the graphs themselves will lose much of their value as a means of comparison between the results of a number of periods.

Another point to be watched, and avoided, is the unnecessary complication of graphs by showing too many series of comparative figures on any single graph. Not more than three series of figures should be shown on any one graph. It is much better to construct a few graphs than to present a confused graph representing several series of figures.

Specimen Graphs and Charts.

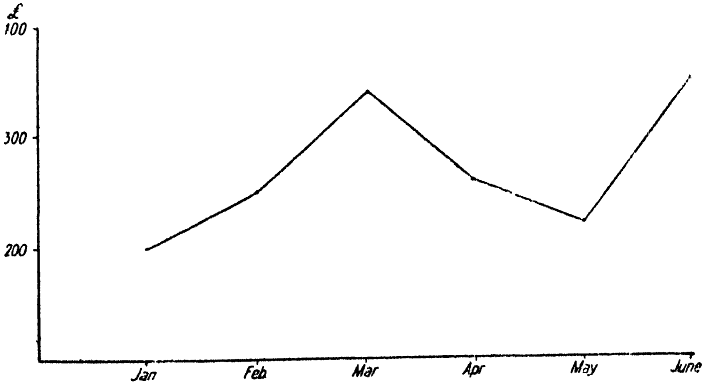
The following specimen graphs and charts will illustrate the manner in which results are more readily conveyed by the use of this method of presentation than by a mere series of figures.

From the following illustrations it will be seen that the

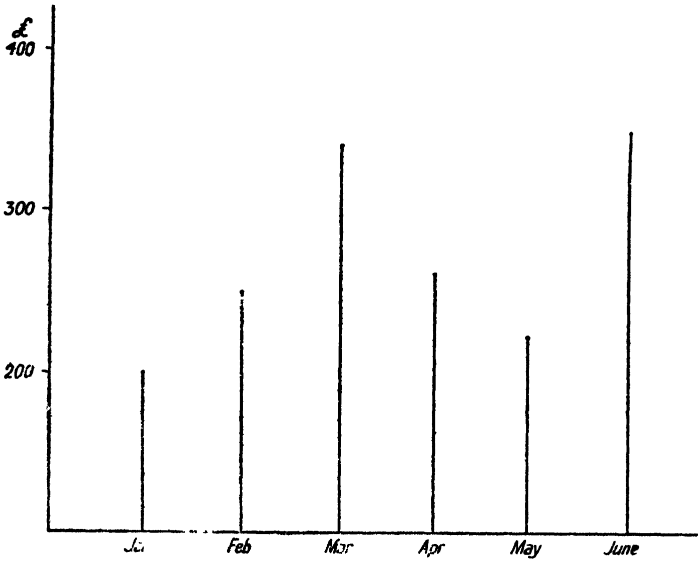
(1) GRAPH OF WORKS EXPENSES.

For Six Months ending 30*th June,* 19. . .

	Jan.	Feb.	Mch.	Apl.	May.	June.
Amounts ...	£200	250	340	260	220	350



(2) CHART OF WORKS EXPENSES.
(*corresponding to preceding graph*)



variation in works expenses for the six months, January to June, is more clearly shown when presented in the form of a graph or chart than when merely indicated by a column of figures, viz.:

January £200
to
June £350

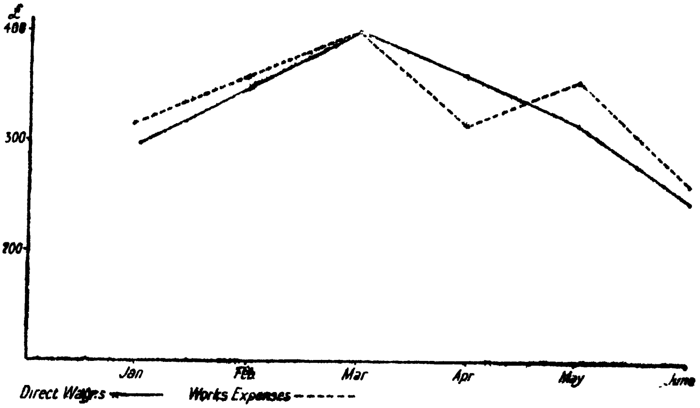
Furthermore, the tendency of the variation during the period is clearly indicated in the above illustrations, and this is of greater value to the management than the actual fluctuations themselves. If it is considered necessary, the utility of the information indicated by the graph may be increased by adopting a weekly basis in place of a monthly basis.

The two illustrations shown opposite are constructed on the same basis as in the case of the previous two illustrations, but in this case two series of figures are shown on the same graph or chart, viz., direct wages and works expenses. In this way the relationship between the two classes of

(3) GRAPH OF DIRECT WAGES AND WORKS EXPENSES

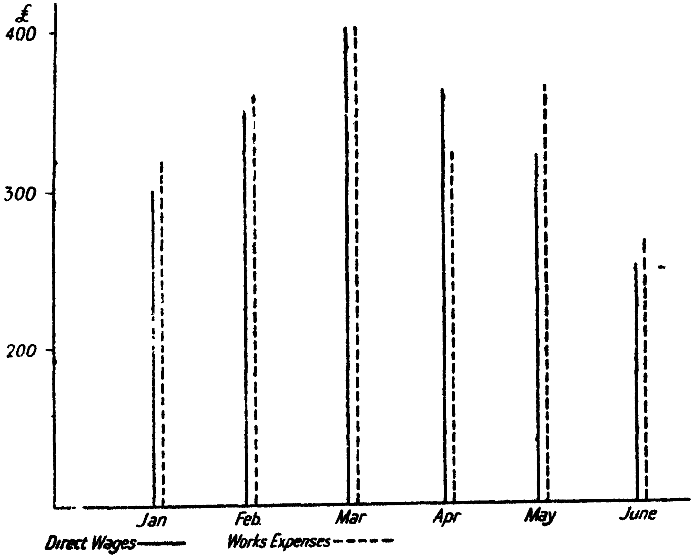
For Six Months ending 30th June, 19......

	Jan.	Feb.	Mch.	Apl.	May.	June.
Direct Wages ...	£300	350	400	360	320	250
Works Expenses ...	£320	360	400	320	360	270



(4) CHART OF DIRECT WAGES AND WORK EXPENSES.

(corresponding to the preceding graph).

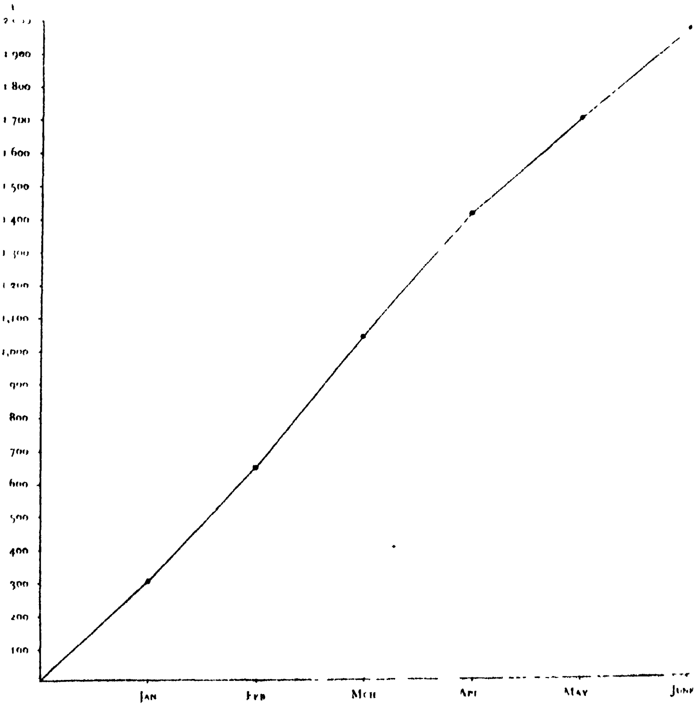


expenditure is well emphasised, thereby clearly indicating to the management the degree of variation between the two items during the period covered by the graph or chart.

(5) CUMULATIVE GRAPH OF DIRECT WAGES.

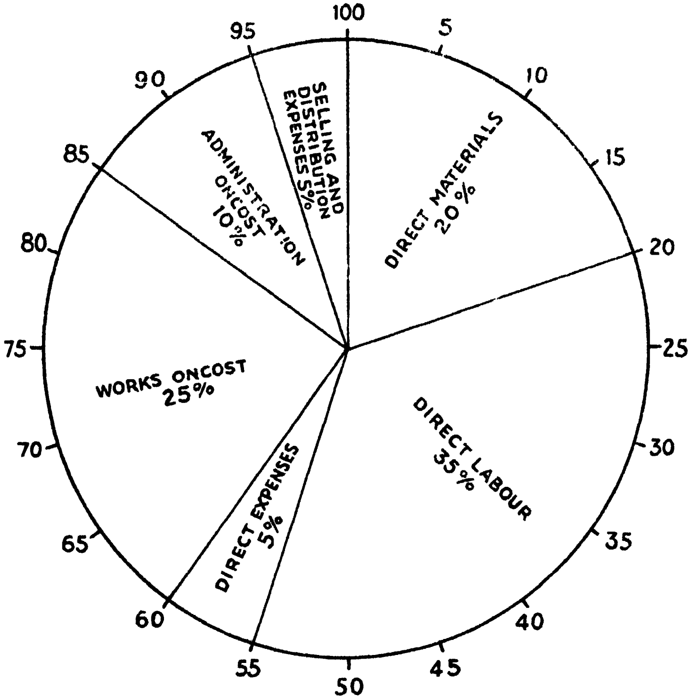
For Six Months ending 30th June, 19. ..

	Jan.	Feb.	Mch.	Apl.	May.	June.
Direct Wages ...	£300	350	400	360	320	250
(Total to date) ...	£300	650	1050	1410	1730	1980



When it is required to record the grand total of certain prescribed information from the commencement of the period under review instead of showing the totals of each week or month, a cumulative graph may be used. In this way the grand total to date is shown at any time, thus emphasising the general trend of the items of expense, etc., to which the figures relate. An example of such a graph, using the figures of direct wages given on page 197, is set out on page 198, and from this it will be noted that the total of direct wages to any given date within the period of six months is shown, while the actual amount of the direct wages for any particular month can readily be ascertained by a simple process of subtraction.

If it is required to show the comparitive proportion of various items to the whole, a circular chart can be used as in the example given below :---



The above chart shows at a glance the proportion that the constituent divisions of cost bear to the total selling cost.

Test Questions

A. What are the advantages to be obtained from the presentation of figures by means of charts or graphs? Give examples of three matters in regard to which you consider this method of illustration would be useful, and describe the kind of chart or graph you would suggest in each case.

B. When making graphs for the presentation of figures, what are the chief points that require attention?

C. Show the following figures in the form of a graph:

Units ...	1000	1500	1650	1800	1950	2000
Labour Cost	£50	80	85	92	98	110

D. Construct a graph or chart for the nine months ending 30th September from the following data:

Direct Wages ...	£120	130	116	79	90	105	109	89	125
Works Oncost ...	£145	160	120	100	99	112	96	75	105

E. What is the particular advantage derived from the presentation of two distinct series of figures on a single graph? Illustrate your answer by an actual example.

F. Explain in what manner non-uniformity in the classification of data and in the actual construction of a graph will affect the value of the information shown by a graph constructed in this manner.

G. A Foundry's output for six months shows the following:

	Tons	Wages	Value
January	378	£151	£1,240
February	429	142	1,728
March ...	527	178	1,823
April	264	115	1,026
May	591	157	1,948
June	438	163	1,717

Graph this table, also show value per ton, and criticise the results.

H. Express graphically the following information. What deductions would you expect the works manager to make from it and what further information would he probably call for in this connection?

Period		No. Produced	Total Cost £	s.	d.	Cost per Unit £	s.	d.
Jan. to March	...	400	4200	0	0	10	10	0
April ...	...	200	1900	0	0	9	10	0
May ...	...	250	2062	10	0	8	5	0
June ...	...	250	2000	0	0	8	0	0
July ...	.	200	1700	0	0	8	10	0
August ...	...	200	1700	0	0	8	10	0
September	. .	300	2400	0	0	8	0	0
Oct. to Dec.	...	500	5000	0	0	10	0	0

J. An employer proposes to introduce the following system of bonus on piece-work:

Where the weekly wages earned exceed £2 but do not exceed £3—25 per cent. of excess over £2.

Where the weekly wages earned exceed £3 but do not exceed £4—33⅓ per cent. of excess over £3

Where the weekly wages earned exceed £4—50 per cent. of excess over £4.

Show diagrammatically or in whatever form you think most instructive to a body of workers the proposal as it would affect the earnings of six workers where the amount of wages before addition of bonus is:

£2; £2 10s.; £3; £3 10s.; £4; £4 10s.

K. Prepare a Circular Chart indicating the relative percentage to total cost of the following items:

Direct Labour, £5,000; Direct Materials, £10,000. Oncost (Works, £8,000; Administrative, £2,000).

CHAPTER XVI

MECHANICAL APPLIANCES USED IN THE COST DEPARTMENT

In addition to the Time-Recording Clocks described in Chapter III, Loose Leaf Ledgers and Card Indexes, there are various other mechanical appliances which may be used to advantage in the Cost Office. In large offices, a considerable economy in clerical time and labour may be effected by the institution of appliances which modern science has rendered practically perfect and simple in operation, and capable of producing amazingly accurate results in the minimum of time. The use of these appliances ensures the speed which is so essential in modern business, especially where important data is required.

It is not, however, within the scope of this work to give an exhaustive list of such appliances, much less to enter into details of their construction and methods of operation. Nevertheless, this book would lack completeness if no mention were made of these important labour-saving devices.

A brief indication is given in the following paragraphs of some of the many mechanical appliances generally to be found in any modern cost office where the costing records involve the handling of a considerable number of figures.

Duplicating Machines.

ADDRESSOGRAPH. This is a mechanical appliance, the primary use of which is to reproduce names and addresses with great rapidity and accuracy, but it is also useful for costing purposes as a means of reproducing stereotyped details on internal forms, *e.g.*, Bin Cards, Stores Audit Forms, etc.

GESTETNER DUPLICATOR. This is an extremely useful apparatus for reproducing all kinds of internal forms, such as

Stores Requisition Notes, Material Transfer Notes, Goods Received Notes, etc.

TYPEWRITER. Nearly all standard makes of typewriters may be used for the purpose of reproducing stereotyped details, as in the compilation of Wages and Materials Abstracts, and for similar purposes.

Calculating Machines.

BURROUGHS ADDING MACHINE. This type of calculating machine is key operated in a similar manner to a typewriter. It facilitates the making of various calculations and at the same time furnishes a printed record of such calculations. This machine is particularly useful in connection with the writing up of Pay Rolls.

BRITANNIC CALCULATOR. This particular machine performs arithmetical operations, including multiplication and division, but does not produce any typed or printed records of such calculations. It is of the slide operated type.

COMPTOMETER. This is also a well-known calculating machine, but of the keyboard—not barrel—type. Practically all kinds of arithmetical calculations may be effected by the use of this particular machine, but no typed or printed records are made.

HOLLERITH MACHINE. This machine represents one of the most advanced systems of mechanical accounting. It operates by means of punching holes in numbered cards. The numbers are arranged in columnar groups, and the number punched out in a group may represent, according to previous determination, a symbol for classification purposes, a quantitative number, weight, or sterling amount, as desired. The cards are then placed in a second machine which sorts the cards, and operates somewhat after the manner of a music roll instrument. A third machine called the tabulator-printer then records the details and totals.

POWERS MACHINE. This machine, like the Hollerith Machine, is useful for the tabulating of numerical records. It also works by means of a system of holes punched in a card, and provides costing details with great rapidity and absolute accuracy.

TYPEWRITER. In addition to the typewriter's usefulness as a duplicating apparatus, machines may be obtained equipped with "adders" and "totalisers" which perform calculations in addition and subtraction, at the same time making records of the calculations in list form.

SLIDE RULE. This is a very useful instrument for making rapid and accurate calculations, but, of course, its utility is considerably less than that of the mechanical calculating machines.

Those readers who are desirous of obtaining more detailed information regarding any of the above machines are recommended to write to any of the numerous mechanical office machinery manufacturers, who will readily supply them with some extremely interesting and informative literature relating to the subject-matter of this particular chapter.

Test Questions

A. What are the advantages to be obtained from using Mechanical Appliances in the Cost Office? Describe the scope and limitations of any appliance (used in the Costing Department) with which you are fully acquainted.

B. Write out a list of Mechanical Appliances such as you would recommend for the purpose of increasing the efficiency of the Cost Office.

C. Enumerate the advantages that a recording calculating machine has over a non-recording machine.

D. What considerations should be taken into account before installing any mechanical devices in the Cost Office?

E. Briefly describe the functions of the following: Gestetner Duplicator, Comptometer, Hollerith Machine.

F. Describe the twofold function of the Typewriter as utilised for costing purposes.

GLOSSARY OF TERMS AND PHRASES USED IN COSTING

ABSOLUTE TON MILE : A unit of cost used in connection with Operating Costs for Motor Haulage businesses, where one load is carried for a long distance. (*See* Commercial Ton Mile.)

ABSORPTION OF ONCOST : The allocation of the amount of Indirect Expenses (Oncost) to each job, contract, process, etc.

ADMINISTRATIVE EXPENSES : A sub-division of Indirect Expenses consisting of those items of expenditure incurred in formulating, directing and controlling the policy, organisation and operations of a business.

ALLIGATION : A method for determining the proportion of different materials to be used in a mixture to produce (*a*) a specified aggregate price, or (*b*) a required specific quantity.

ALL-IN COST : The total expense relating to production, administration, selling, and distribution. (*See* Total Cost).

ALLOCATION OF ONCOST : (*See* Absorption of Oncost).

AMORTISATION : The gradual extinction of a liability, usually by means of a sinking fund, also the process of spreading over a fixed period the depreciation in value of wasting assets, such as leases and royalties.

ANALYTICAL INDUSTRY : An industry in which different products are extracted from the raw material used, which is therefore analysed into its useful constituents, *e.g.*, Sugar, Flour and Meat Packing industries. (*See* Continuous Industry).

ANCILLARY LABOUR : (*See* Indirect Labour).

APPORTIONMENT OF ONCOST : (*See* Absorption of Oncost).

APPRECIATION : The increase in value of assets.

ASCERTAINED COST : (*See* Cost Ascertainment).

ASSEMBLY INDUSTRY : An industry where various products must first be manufactured to their final stages, and then another set of operations must join the parts into the finished whole, *e.g.*, Motor Car Manufacturers and Shipbuilders.

AUXILIARY LABOUR : (*See* Indirect Labour).

BALANCE AND DEBT METHOD : A method of remuneration by which the excess of a worker's hourly earnings over his piece work earnings is carried forward and deducted from future excess piece work earnings.

BALANCE METHOD : A method of remuneration by which a worker receives the higher of his guaranteed hourly earnings or piece work earnings.

BATCH COSTING : The compilation of records of revenue expenditure where the unit of production consists of a quantity or a series of articles of the same type.

BEDAUX POINT PREMIUM PLAN. A method of remuneration, similar to the Halsey-Weir system, by which a bonus is paid on the points above the standard number set that are achieved by the worker. (In this case, a point—termed a " B "—is the quantity of work that a worker, under normal conditions, should be able to accomplish in one minute). The bonus is divided between the worker and the supervisor in the proportion of, say, three-fourths and one-fourth respectively. Under this plan, a worker is considered efficient, and is guaranteed his day work, if he achieves the standard number of points set. If he fails to achieve this number, he is penalised proportionately.

BILL OF MATERIALS : A specification showing the quantity and description of the materials required for a particular contract or order. (*See* Specification of Materials).

BIN CARD : A record card attached to each Bin (or kept in a Card Drawer) on which details of receipts and issues of materials are entered, as and when they are placed in, or taken out of, the Bin (or other receptacle). (*See* Stock Record Card).

Break Clause : A clause which permits the contract to be determined by the buyer and defines the extent to which the contractor is entitled to indemnity for work in hand, and for liabilities legitimately incurred, if this power is exercised.

Budgetary Control : The systematic control of business operations by means of pre-determined standards prepared in minute detail and assembled into a comprehensive programme, in order to provide a basis of comparison with actual performances and costs, with the object of attaining the final results indicated in the programme.

Bulk Materials : Material not in unit form directly suited to the work in hand, as, for instance, materials not measurable except by weight or volume.

Bunch Costing : (*See* Batch Costing).

Burden : (*See* Oncost).

By-Product : A secondary product; something obtained from a manufacturing process other than the principal product.

Car Mile : One of the costing units used in connection with the Operating Costs of Tramways.

Chargeable Expenses : Expenditure other than Direct Materials or Direct Wages that can be definitely allocated or charged to a particular job, contract, process, etc.

Clock Card : A record card used for the mechanical recording of the time of arrival and departure of workers and/or the commencing and finishing of jobs and operations.

Code : (*See* Symbols).

Collective Payments by Results : Collective remuneration for work performed by a group of workers, usually distributed to the individual workers on a pre-determined basis. (*See* Priestman Method).

Commercial Ton Mile : A unit of cost used in connection with Operating Costs for Motor Haulage businesses, where the load carried is varied from time to time during the course of the total journey travelled by the motor vehicle. (*See* Absolute Ton Mile).

COMPLETED STOCK : (*See* Finished Stock).

COMPONENT : A constituent part which by assembly with other parts helps to form a complete product or a sub-assembly thereof.

COMPOSITE COSTING : (*See* Multiple Costing).

CONSTANT EXPENSES : (*See* Fixed Oncost).

CONSUMABLE STORES : (*See* Indirect Materials).

CONTINUOUS INDUSTRY : An industry in which the product is received at one place, and the operations to change the raw material into finished commodities are performed in a single series on the entire mass of material, *i.e.*, the raw material goes in at one end of the plant and passes through to the final stage of manufacture without waiting for any other finished parts to be brought to it, from other types of manufacture. (*See* Analytical and Synthetical Industries).

CONTINUOUS INVENTORY : (*See* Perpetual Inventory).

CONTRACT SYSTEM : A method of remuneration by which an agreed sum is paid to a foreman, etc., for the execution of certain work, such foreman to find the necessary labour. Alternatively, an agreement between employers and employees for a fixed price for the accomplishment of a given task.

CONTROL ACCOUNT : A classified and summarised statement in debit and credit form showing the totals of individual items which have been debited and/or credited to individual accounts. The balance of the account forms a check or control on the total of the balances of the individual accounts, and the account constitutes a link between the cost accounts and the financial accounts. (*See* Cost Control).

CONVERSION COST : The cost of converting raw materials into prepared materials or finished products, exclusive of the cost of raw materials.

CONVERTIBLE STORES : (*See* Direct Materials).

CO-PARTNERSHIP : A method of remuneration by which the workers are given, in the form of shares or otherwise, an interest in a business concern. Usually the rights attached to co-partnership shares are limited or restricted.

COST ACCOUNTING : The recording of the detail and total cost as ascertained under the system of cost finding in force. (*See* Cost Finding).

COST ALLOCATION : The distribution of costs to units, processes, services or products in the proportions in which they have incurred it.

COST AUDIT : The examination and verification of the correctness of the cost accounts and calculations and of the methods used in their preparation.

COST CONTROL : A means of controlling expenditure in detail and in total, and a means of facilitating the reconciliation of the cost accounts with the financial accounts. (*See* Control Account).

COST ESTIMATING : The pre-determination of the probable cost of a job, article, process, etc., under a given set of conditions.

COST EXAMINATION : (*See* Cost Investigation).

COST FINDING : The ascertainment of the detail and total cost of a particular job, article, process, etc. (*See* Cost Accounting).

COSTING : (*See* Cost Finding).

COST INVESTIGATION : A general term for the enquiry into costs of production by one or other process of costing.

COST OF PRODUCTION : The total cost of manufacture of any article or process. (*See* Total Cost).

COST-PLUS CONTRACTS : These refer to contracts placed with contractors on the basis of cost plus an agreed sum or percentage to cover overheads and profits. (*See* Time and Lime Contracts).

Cost-Plus Costing : (*See* Cost-Plus Contracts).

Cost Premium : A method of remuneration which tends to effect economy in labour and materials by the payment of a premium based on reduction in total cost as compared with standard cost.

Cost Sheet : A form on which cost details as regards labour, etc., are summarised in order to ascertain total costs.

Cost Summary : (*See* Cost Sheet).

Cost Unit : The quantity upon which cost can be conveniently allocated or determined.

Daywork : The method of remunerating labour on a time basis.

Dead Charges : Indirect unproductive expenditure over and above Direct Wages, Direct Materials, Direct Expenses and Factory or Works Oncost (*i.e.*, over and above Factory or Works Cost).

Defective Work : That proportion of goods wholly or partly manufactured which contains some flaw in the material, or which has been spoilt during a process, operation, etc., and is thus inferior to the required standard.

Defective Work Charges : The cost of rectifying faulty work caused by defects in design, material, workmanship or management.

Defective Work Report : A statement detailing the extent and causes of defective work, sometimes including suggestions for its prevention or remedy.

Deferred Charges : Items of expense which not being wholly consumed in the current accounting period, have unabsorbed balances to be carried forward to the ensuing periods.

Deferred Credits : Income received during the current period on account of the ensuing period to which they are to be credited.

Deferred Maintenance : Normal or abnormal repair work or upkeep of buildings or equipment, which should be performed and charged in the current accounting period, but which for various reasons is postponed to a subsequent period.

Delivery Note: A form of request to receive goods, which may or may not contain a detailed description. or an advice of goods to be received.

Departmental Costing: The method of costing used when it is desired to ascertain the cost of production of each department separately.

Departmental Oncost: The amounts of Works Expenses (Works Oncost) allocated to the various departments.

Depletion: The exhaustion of an asset by the extraction of raw materials, *e.g.*, the extraction of minerals from a mine or clay from a clay pit. This term is sometimes used to indicate the exhaustion of stores in bins by withdrawals.

Depreciation: The gradual decrease in the value of an asset from any internal or external cause, *e.g.*, wear and tear and effluxion of time.

Differential Oncost: The application of different methods of allocation of Works Oncost to the various departments of a works or factory, *e.g.*, Dept. A: Machine Hour Rate; Dept. B: Percentage on Direct Wages, etc.

Differential Piece Rate System: A method of remuneration in which a scale of quantities is first determined and piece rates are fixed which are applicable to each quantity, differentiation being on a sliding scale. (*See* Taylor System).

Direct Expenses: (*See* Chargeable Expenses).

Direct Labour: Productive Wages which can be definitely allocated or charged to a particular job, contract, process, etc.

Direct Labour Hour: A method of recovery of oncost based on the time taken to complete a process, operation, etc., and expressed as a rate per direct labour hour.

Direct Materials: Those materials consumed and/or converted in the process of manufacture that may be allocated or charged direct to a particular job, contract, process, etc.

Direct Purchases : Direct materials purchased specially for use on a specific job, contract, etc.

Direct Wages : (*See* Direct Labour).

Discharge Note : A record made when a worker is dismissed or leaves so that his name may be removed from the pay-roll.

Distribution Expense : The expense of distributing finished products.

Elements of Cost : Comprise the three main groups—labour, materials and expenses, whether direct or indirect.

Emerson Efficiency Bonus : A system of remuneration by which the worker's daily rate is guaranteed, and a bonus is paid for time saved.

Establishment Charges : Indirect Expenses, termed "Oncost," which are not definitely traceable to any particular job, contract, process, etc.

Estimates : Approximate costs based on previous actual costs, modified according to current market prices, and current labour rates, and probable fluctuations in such prices and rates. Sometimes Estimates include percentages for profit, and then form Quotation Selling Prices.

Estimating : (*See* Cost Estimating).

Expense Budget : (*See* Budgetary Control).

Expense Burden : (*See* Establishment Charges).

Expense Materials : (*See* Indirect Materials).

Experimental Expenses : Those items of expenditure incurred in connection with the development and/or improvements in the process of manufacture of standard products or on specific orders, etc.

Factory Cost : The total of all direct expenditure incurred in the manufacture of any article, etc., together with the factory expenses incurred on such article, *i.e.*, Prime Cost plus Factory (Works) Oncost.

Factory Expenses : A sub-division of Indirect Expenses consisting of all expenses incurred in running the factory.

FACTORY ORDER: A document given out to the Works, and containing a full description of work to be performed, and the date by which such work is to be completed.

FINISHED MATERIAL WASTE: The avoidable waste such as deterioration of finished stock due to faulty methods of storing, handling, etc., and the unavoidable waste such as waste in finished stock due to shrinkage, evaporation, etc.

FINISHED PARTS: Those component items placed into stores pending final assembly of the completed product.

FINISHED STOCK: The completed and finally assembled product awaiting sale and despatch.

FIXED ASSETS: The permanent equipment of an undertaking.

FIXED ONCOST (OR OVERHEADS): Those items of indirect expense that do not fluctuate or vary in accordance with the rise or fall in the volume of production, *e.g.*, rent, rates, taxes, fire insurance, and depreciation of fixed assets.

FIXED PRICE CONTRACT: A contract for a specific output at a price which should be fixed before production begins, or at a very early stage in production. The price may be fixed in terms of output, or as a total which will cover the whole output. (*See* Lump Sum Contract).

FLOATING ASSETS: Those assets which in the ordinary course of business are continually changing and which are intended either for consumption in the ordinary process of manufacture or trading operations or for sale, and such intermediate forms, *e.g.*, book debts, as they may take in the process of conversion into cash.

FLOATING ONCOST (OR OVERHEADS): Those items of indirect expense that fluctuate with the rise or fall in the volume of production, *e.g.*, indirect wages, power, and fuel.

FREE COMPETITIVE TENDER: (*See* Open Tender.)

GANTT BONUS: A method of remuneration by which the daily rate is guaranteed and a bonus paid according to whether or not the definite standard is reached by the workman.

GATE CARD: A card used for the mechanical recording of the time of arrival and departure of workmen. (*See* Clock Card.)

GOODS RECEIVED BOOK: A book in which full particulars of all goods received by a business are recorded.

GOODS RECEIVED NOTE: A document giving details of goods received by the Storekeeper or Goods Receiving Clerk, by whom it is made out. Any remark as to the condition of the goods received is shown on the Goods Received Note, which is signed by the Storekeeper or Goods Receiving Clerk and sent to the Purchase Department, where it is compared with the Delivery Note and Invoice.

GUARANTEE PAY: The amount by which the earnings of a worker (who has been employed on a system of payment by results for a period of a week or less) fall short of the value of that period calculated at his time rate, where it is the recognised practice to guarantee time rate.

HALSEY PREMIUM: A method of remuneration by which a bonus is paid based upon a fixed percentage of the saving in actual time as compared with standard time.

HOURLY RATE: (*See* Machine Hour Rate and Manual Hour Rate).

IDLE TIME: The period during which a workman or machine is kept waiting for materials, or while repairs to the machine are being carried out, or through accidents, or temporary stoppage of the supply of power, etc.

INDEX NUMBERS: Statistical figures used in connection with Standard Costs for the purpose of indicating the extent of the variations in Actual Costs as compared with Standard Costs, *e.g.*, if the Standard Cost item of expenditure is represented by 100 and the Actual Cost shows 105 under the same conditions, a fall of 5 points in efficiency is thereby indicated.

INDIRECT EXPENSES: Expenditure which cannot be definitely allocated or charged to any particular job, contract, etc., or which cannot be directly allocated to any single department, *e.g.*, power, lighting and heating. The term "Oncost" is now generally used.

INDIRECT LABOUR: Unproductive wages which cannot be definitely allocated or charged to a particular job, contract, etc., *e.g.*, timekeepers and storekeepers. It is one of the items included in Works Oncost.

INDIRECT MATERIALS: Those materials that cannot be allocated or charged direct to any particular job, contract, etc., *e.g.*, lubricants and cleaning materials.

INDIRECT ONCOST: A term used in connection with departmental oncost, and which represents items of Works Oncost which cannot be directly allocated or charged to any single department.

INDIRECT WAGES: (*See* Indirect Labour.)

INTEREST: That proportion of interest on capital, debentures, etc., that is included as an element in the cost of production for the use of the capital moneys involved.

INTERLOCKING SYSTEM: A system by which the reconciliation of the cost accounts with the financial accounts is ensured. (*See* Control Account).

JOB CARD: A card used by direct workers for recording the time devoted to any particular job, contract, process, etc., and by indirect workers for recording the time devoted to each service order or distinct class of indirect work.

JOB COSTING: The compilation of records of expenditure applicable to industries where it is convenient, or practicable, to definitely determine the prime cost of each job or contract.

JOB NUMBER: The identification number and symbol allocated to each job for costing, tracing and location purposes.

JOB RATE: A pre-arranged basis of payment for the accomplishment of a specified task. (*See* Piece Rate).

JOB TICKET: (*See* Job Card),

LIMITED COMPETITIVE TENDER: A system where only firms on an approved list are invited (usually by a Government department) to tender for a contract.

LIMITING PRICE CONTRACT: (*See* Maximum Price Contract).

LOCK-OUT: The refusal to employ the services of the workers on the terms and conditions demanded by the workers.

LOOSE TOOLS: Tools (and plant) required for manufacture, which have no fixed or definite location in the factory and can be moved freely from one part to another.

LUMP SUM CONTRACT: A contract for which a total amount is fixed to cover the whole of a specified output. (*See* Fixed Price Contract).

MACHINE CARD: A card for recording output per machine and, if required, stoppages, breakdowns and repairs. It may also record date of purchase, price and value for depreciation purposes.

MACHINE HOUR RATE: A method of allocating Works Oncost in industries where there is a preponderance of machinery as against manual labour. The rate is ascertained by dividing the original cost and estimated cost of running by the estimated working life of the machine in hours. Alternatively, the required rate may be obtained by dividing the depreciation and estimated cost of running for one year by the estimated working hours for the same period. The rate obtained is used for the allocation of Works Oncost to each job, etc.—the amount for each job being the number of hours taken to complete the job multiplied by the rate obtained by either of the above formulæ.

MAINTENANCE: The cost of keeping in working order the plant, tools, etc., of a business, including the expenditure incurred on the renewal of such items. Also the cost of preservation of buildings, etc.

MANAGEMENT: The supervision of the carrying out of the every-day duties of a business.

MANUAL HOUR RATE : A method of allocating Works Oncost to jobs, contracts, etc. The total of the Works Expenses incurred during a selected period is divided by the number of manual productive hours worked during the same period, each job, etc., being charged at the hourly rate multiplied by the number of manual hours applicable to such job.

MANUFACTURING BUDGET : (*See* Budgetary Control).

MANUFACTURING COST : (*See* Factory Cost).

MANUFACTURING ORDER : (*See* Production Order).

MASS PRODUCTION : The production in large quantities of standardised products with the primary object of reducing cost.

MATERIALS ABSTRACT : An analysis of the cost of materials used for jobs, etc., during a given period, in order to ascertain the amount applicable to each job, etc.

MATERIALS CREDIT NOTE : A document used "internally" giving details of surplus materials returned to the Stores from a factory department, or materials returned to Stores from a job as being in excess of requirements. (*See* Stores Credit Note).

MATERIALS REQUISITION : An order on the Storekeeper to issue certain materials required in connection with a particular job, etc. (*See* Stores Requisition).

MATERIALS SPECIFICATION LIST : (*See* Bill of Materials).

MATERIALS TRANSFER SLIP : A document giving particulars of surplus or unsuitable materials, transferred from a job in one department to another job in the same or another department.

MAXIMUM PRICE CONTRACT : A contract in which a maximum price (which includes both cost and profit) is set before production, and the contractor is paid the ascertained costs, plus an agreed profit, subject to the maximum price not being exceeded. The contractor is not paid for any proportion of a saving on the maximum price.

MAXIMUM STOCK : The largest quantity of stock which is necessary to satisfy the normal requirements of the works. (*See* Minimum Stock).

MERRICK DIFFERENTIAL METHOD : A method of remuneration by which an increasing piece rate is paid as the output in the allotted time increases beyond a stated quantity.

METAL CHECKS : Small discs or tallies used in connection with the recording of workmen's time, where mechanical time-recorders are not utilised.

MINIMUM STOCK : The quantity below which the stock must not be allowed to fall if normal works requirements are to be satisfied. (*See* Maximum Stock).

MULTIPLE COSTING : The system of compilation of records of expenditure applicable to industries where the products differ in value, in type, and in the number or variety of processes necessary for completion, *e.g.*, Hosiery, Cycle Accessories, etc.

MUNICIPAL COSTING : The combination of methods of costing adopted by Municipalities for costing works and services undertaken.

NON-COMPETITIVE TENDER : A system by which not more than one firm is invited (usually by a Government department) to tender for a contract.

NON-PRODUCTIVE LABOUR : (*See* Indirect Labour).

NON-PRODUCTIVE ONCOST : (*See* Indirect Oncost).

NORMAL COST : A standard cost for which normal working conditions and rates have been taken as the standard. (*See* Standard Costs).

OBSOLESCENCE : The process by which an asset suddenly loses its value by inutility, usually because of its inability to compete with an improved type of asset.

OFFICE ONCOST : Office Expenses which cannot be directly allocated or charged to any particular job, contract, etc., *e.g.*, salaries, office rent, stationery, etc.

OFFICE ONCOST SUSPENSE ACCOUNT : An account which is debited temporarily with the amount of Office Oncost accrued on Work-in-Progress (uncompleted jobs) at the end of a financial period.

OFFICE OVERHEADS : (*See* Office Oncost).

OMNIBUS ORDER : A Factory or Works Order for a series of finished parts for stock. This method economises cost of production and expedites the manufacture and delivery of jobs to customers' orders.

ON CHARGES : (*See* Oncost).

ONCOST : The total of Indirect Labour, Materials, and Expenses which cannot be definitely allocated or charged to any particular job, contract, etc. It is divided into Works Oncost, Office Oncost, and Selling and Distributive Expenses and should be spread over the whole of the production benefiting therefrom, but the latter class of expense is sometimes excluded from the costs. (*See* Overhead Charges).

ONCOST MATERIALS : (*See* Indirect Materials).

OPEN TENDER : A system in which opportunity is given (usually by a Government department) to all firms in a trade or industry to tender for a contract subject to specifications laid down in the invitation to tender.

OPERATING COSTS : The system of compilation of records of expenditure incurred in running Railways, Tramways, Fleets of Motor Lorries, and similar businesses where services are rendered rather than goods produced.

OPERATING LABOUR : (*See* Direct Labour).

OPERATION COSTS : The compiled records of revenue expenditure relating to the cost of production of articles which pass through a series of operations before completion. The cost of each operation is obtained as well as the total cost of the various operations and the cumulative effect of the wastage.

ORDERING LEVEL : That point between the maximum and minimum quantities of stock at which the storekeeper must make out a Purchase Requisition.

ORGANISATION : The term given to the systematic co-ordination of the many activities which go to make up a modern business enterprise.

OUTPUT COSTS : The records of compilation of expenditure in industries where the production consists of one particular kind of article or material, as in the case of Collieries, Ironworks, Brickworks, Breweries, etc.

OUTWORKERS : Those employees working away from the factory, etc., *e.g.*, on customers' own sites or in workers' own homes.

OVERABSORBED EXPENSE : The excess of the amounts charged to orders, jobs or other cost units by pre-determined rates of absorption over and above the actual total overhead.

OVERHEAD CHARGES : The Indirect Expenses incurred over and above Prime Cost Expenditure. (*See* Oncost).

OVERHEADS : (*See* Oncost).

PARTLY FINISHED STOCK : (*See* Work-in-Progress).

PAYMENT BY RESULTS : Remuneration for increased effort, *e.g.*, by means of piece work, premium bonus or similar system.

PAY-OFF NOTE : Notification to the pay office of the wages due to an employee on the termination of his employment.

PAY ROLL : A detailed summary of the amount of wages to which each worker is entitled.

PERPETUAL INVENTORY : The record of materials in the Stores provided by the Bin Cards or Stores Ledger to facilitate regular checking and to obviate closing down for stock-taking purposes. After each movement of materials in connection with any Bin, the balance of stock in hand is entered on the Bin Card. The Bin Card balances are checked from time to time by means of the Stores Audit.

PIECE RATE : A method of remuneration by which the worker receives a definite amount for performing a stipulated quantity of work.

Piece Work Balance : The difference between piece work earnings and the value of the time taken calculated at standard time rates.

Planning Department : A section of the works staff whose duties comprise the arrangement of the work, operations, and processes.

Plant : Those items of producing machinery other than loose tools, *i.e.*, those which are permanently fixed in position as distinct from portable tools.

Plant Record : (*See* Machine Card).

Policy : A term which implies the regulation or guidance of the affairs of an organisation towards the attainment of a definite objective.

Pre-determined Cost : (*See* Standard Costs).

Premium Earnings : That portion of workers' remuneration over and above the guaranteed hourly, daily or weekly rates.

Priestman Method : A method of remuneration by which all employees without exception benefit financially by an increased output.

Prime Cost : The expenditure in materials, wages and other disbursements which can be definitely allocated or charged to a particular job, contract. etc.

Prime Cost Materials : (*See* Direct Materials).

Process Costing : The method of compilation of records of expenditure relating to a given stage or process of manufacture where one article loses its identity during the process of manufacture, and where by-products may arise. Applicable to Chemical Works, Foundries, etc.

Process Labour : (See Direct Labour).

Process Materials : (*See* Direct Materials).

Production Account : A classified and summarised statement in debit and credit form, showing the Works Cost of production of the whole of the output during a specified period.

PRODUCTION COST : (*See* Cost of Production).

PRODUCTION EFFICIENCY : The ratio of actual cost or actual time to standard cost or standard time.

PRODUCTION MATERIALS : (*See* Direct Materials).

PRODUCTION ORDER : A written order by which instructions are given as to the carrying out of stated jobs, etc.

PRODUCTIVE LABOUR : (*See* Direct Labour).

PRODUCTIVE ONCOST : (*See* Works Oncost).

PROGRESS DEPARTMENT : A section of the works staff whose duties comprise the following up of the progress of the different jobs and processes; the supervision of the supplies of materials; investigation into the causes of idle time, defective material, breakdowns and stoppages; and the preparation of reports on the progress of jobs and processes.

PURCHASE ORDER : A document sent out by the Purchase or Buying Department to a trader, firm or company ordering specified goods to be delivered to the Works.

PURCHASE REQUISITION : An internal document sent by the Storekeeper to the Purchase or Buying Department, giving details of materials required to replenish his stocks, or for specific jobs, contracts, etc.

RATE CARDS : Cards used for recording details of the rates of pay of each worker.

RATIO NUMBERS : (*See* Index Numbers).

RAW MATERIALS : Materials purchased or produced in a natural or manufactured state and forming the basic direct materials of the units of production.

RE-ORDERING LEVEL : (*See* Ordering Level).

RESIDUAL VALUE : Value of materials remaining after having been used in a process, and which may be used again in a similar or different manner.

ROWAN METHOD : A method of remuneration by which the daily rate is guaranteed and a bonus paid based upon the saving in time effected by the worker.

Running Contract: A contract providing for the supply of a commodity over a specified period within which the buyer may from time to time order quantities of the commodity on terms laid down in the contract.

Running Costs: (*See* Operating Costs).

Scrap Materials: Materials spoilt in the course of manufacture and the residue of raw materials accruing from operations or processes.

Scrap Value: The value of an asset at the end of its useful life, or of an article which is no longer wanted.

Selling and Distributive Expense: A sub-division of Oncost. It comprises such items of expenditure as Advertising, Travellers' Salaries and Commission, Carriage Outwards, etc.

Service Department: Any department which provides motive power or implements for the running of all or any of the productive departments. Examples are: Electric Power House, Steam Boiler Plant, Tool Shop, etc. Separate cost records are compiled for each Service Department, and the cost of running such departments is apportioned over the Productive Departments in accordance with the amount of power, etc., used in each department.

Shop Cost: Cost of the production of a particular shop, inclusive of oncost.

Single Oncost Rate: A flat rate of Works Oncost for application to the whole of the products of a factory or works, as distinct from a departmental rate.

Single Output Costs: (*See* Output Costs).

Specification of Materials: (*See* Bill of Materials).

Standard Costs: Pre-determined costs based upon a given set of conditions, and compiled for the purpose of testing by comparisons the efficiency or otherwise of actual costs.

Stock: Finished products of the works and the products which have been partly completed and set aside for further treatment.

STOCK ORDER: Written instructions to the factory detailing work to be manufactured for stock.

STOCK RECORD CARD: A record card kept of items of materials and goods in stock. (*See* Bin Card).

STOREHOUSE: The Works Department where stocks of materials, finished parts, etc., are kept.

STOREKEEPER: A person responsible for the safe custody of the goods delivered to him and for the issuing of goods required for specific jobs, etc.

STORES: Stocks of materials, finished parts, etc., kept in the Storehouse for issue to production and maintenance orders as and when required. The term is also applied erroneously to the department where the stores are kept.

STORES AUDIT: A continuous, or periodical, inspection of the stocks of materials in the Stores, with a view to checking the balances shown on the Bin Cards with the actual stocks in the Bins.

STORES CODE: A series of symbols indicating the various descriptions, sizes and qualities of materials.

STORES CREDIT NOTE: A form stating the quantity, etc., of materials returned from a job, contract or process to the Stores as being in excess of requirements. (*See* Materials Credit Note).

STORES MATERIALS: (*See* Direct Materials).

STORES REQUISITION: A document issued from a Works Department to the Storekeeper as an authority to issue the materials specified in the document. It is signed by the Foreman of the Department or by the Works Manager. (*See* Materials Requisition).

STORES TRANSFER NOTE: (*See* Materials Transfer Note).

STORES WARRANT: (*See* Stores Requisition).

STRAIGHT PIECE-WORK: Any job or operation for which a definite stipulated price is paid to the worker, and for which the worker is not entitled to receive any further remuneration in the form of a premium or bonus.

STRIKE : The refusal of the workers to accept employment on the terms and conditions offered by the employer.

SUB-CONTRACT : A contract made by the main contractor with another firm for the supply of a finished product, or for the processing of a product, or for a service (such as cartage), which is a part or component of the subject of the main contract.

SWARF : (*See* Scrap Materials).

SYMBOLS : Letters or numbers allocated to certain classes of work or works jobs as distinct from consecutive numbers allocated to jobs for customers. (*E.g.*, PR = Plant Repairs; BM = Building Maintenance, etc.). Symbols are also used to indicate different classes of waiting or idle time.

SYNTHETICAL INDUSTRY : An industry which is concerned with the manufacture of commodities which have to be built up in a certain manner from the raw materials, *e.g.*, Textiles and Steel Industries. (*See* Continuous Industry).

SYSTEM : The term given to the method of control adopted by the management for supervising the carrying out of the everyday duties of a business.

TARGET CONTRACTS : A term used in connection with large constructional contracts by which the agreed anticipated cost is treated as the Target Cost, and on the cost so determined the contractor is paid either an agreed percentage or a fixed sum to cover his oncost and profit, with generally a bonus for any saving on the target cost.

TARGET COSTING : (*See* Target Contracts).

TAYLOR SYSTEM : A method of remuneration by which the daily rate is not guaranteed, but which is based upon two piece rates, the lower rate operating up to 100 per cent. efficiency, and the higher rate on output in excess of the stipulated standard.

TERMINAL COSTING : (See Job Costing).

TIME AND LIME CONTRACTS : (*See* Cost-Plus Contracts).

TIME BOOK: A book formerly used for recording the times of arrival and departure of workmen. This method is now usually replaced by mechanical time-recorders.

TIME CARD: (*See* Clock Card).

TIME RATE: The rate of wages paid to a worker on a time basis.

TIME RECORDERS: Mechanical devices for the automatic recording of workmen's time, *e.g.*, Gledhill Brook Time Recorder, etc.

TIME SHEET: A form used by workmen to record the amount of time spent by them upon each job, process, etc., upon which they have been engaged during the day or week.

TON MILE: A costing unit used in Operating Costs, especially in connection with Railway Goods Traffic, Motor Haulage, etc. The cost per ton mile is ascertained by dividing the total expenditure by the number of miles multiplied by the number of tons carried.

TOOL CHECKS: Metal Checks used for keeping track of loose tools issued to workmen, the metal check in respect of the tool being replaced by a check bearing the workman's number when a tool is issued to him.

TOOL CLEARANCE RECEIPT: A note given to a worker, when he leaves his employment, to the effect that he has accounted for all tools in his custody.

TOTAL COST: This consists of Prime Cost plus Oncost. Stated more fully: Prime Cost plus Works Oncost = Works Cost; Works Cost plus Office Oncost = Total Cost. (*See* All-In Cost).

TRAIN MILE: One of the costing units used in Operating Costs in connection with Railways, as represented by the total expenditure divided by the total number of miles covered by the train.

UNABSORBED EXPENSE: The excess of the total actual overhead over and above the amounts charged to orders, jobs or other cost units by pre-determined rates of absorption,

Uniform Costing: A system of uniform application of the principles of a costing method agreed upon and adopted by the whole, or the majority, of the manufacturers, or executives, in any specific industry.

Unit Costing: A method of costing by an all-round unit of production where manufacture is continuous and the units are identical. It may be combined with process, operation or batch costing.

Unit Expense Rate: A method of recovering oncost by means of a fixed charge per unit produced.

Unit of Cost: (*See* Cost Unit).

Unit of Production: The standard quantity, volume, weight or measurement used in Single Output Costing, *e.g.*, standard barrel of beer in a brewery; ton of saleable coal in a colliery; 1,000 bricks in a brickworks, etc.

Unproductive Labour: (*See* Indirect Labour).

Unproductive Oncost: (*See* Office Oncost).

Variable Expenses: (*See* Floating Oncost).

Variation Clauses: Clauses inserted in a contract which provide that in the event of certain alterations in cost which are outside the contractor's control, there shall be an adjustment of the payment made to him.

Wages Abstract: An analysis of the productive wages paid for a given period in order to ascertain the amount applicable to each job, contract, process, etc.

Wages Advice Note: A document sent to the cost office and wages department when amendments are made in the basis of a worker's remuneration.

Waiting Time: (*See* Idle Time).

Wear and Tear: (*See* Depreciation).

Working Costs: (*See* Operating Costs).

Work-in-Progress : Uncompleted jobs, or contracts, or other uncompleted work on hand at any particular time. The value of such work includes the proportion of oncost absorbed. (For financial purposes only, sometimes about two-thirds of the proportionate profit earned is also added).

Works Cost : (*See* Factory Cost).

Works Expenses : (*See* Factory Expenses).

Works Oncost : Works expenditure on materials, labour, and other disbursements which cannot be definitely allocated or charged to a particular job, contract, process, etc.

Works Oncost Suspense Account : An account which is temporarily debited with the amount of Works Oncost accrued on Work-in-Progress (Uncompleted Jobs) at the end of a financial period.

Works Order : (*See* Factory Order).

Works Overheads : (*See* Works Oncost).

SPECIMEN EXAMINATION PAPERS

The Institute of Chartered Accountants

(Separate papers are not set on Costing, but individual questions on this subject are incorporated in various papers).

INTERMEDIATE EXAMINATION.

(August, 1942.)

BOOK-KEEPING AND ACCOUNTS (INCLUDING PARTNERSHIP)

3. A factory manufactures two different types of pencil, one round and the other oval. The following figures relate to output and costs for the month of August, 1942:

	Round			Oval		
Pencils produced, dozens ...	12,000			2,400		
Direct Factory Cost:	£	s.	d.	£.	s.	d.
Materials	101	10	0	21	4	0
Wages	366	10	0	98	14	0
Rent, Power, Heat, etc. ...	90	0	0	19	12	0
	£558	0	0	£139	10	0

Costs not directly apportioned:

	£	s.	d.
Factory Supervision and Sundries	140	0	0
Packing Department, Wages	19	4	0
ditto. Rent, Heating, etc. ...	9	0	0
Selling and Management Expenses	186	12	0

Factory supervision and sundries are allocated in proportion to the direct factory cost. Selling and management expenses and packing department expenses are treated as being the same for each type of pencil. Both types are packed in cartons of a dozen, costing 9s. 6d. per 100 cartons.

Prepare a cost statement showing the cost of each type of pencil per dozen, packed. (All figures to be shown in pence and decimals to two places.)

BOOK-KEEPING AND ACCOUNTS (INCLUDING LIMITED COMPANIES).

5. Briefly state how you would deal with the following in Cost Accounts:

   (1) Idle Time;

   (2) Defective Work;

   (3) Expenditure on Research.

FINAL EXAMINATION.

(January, 1942.)

GENERAL FINANCIAL KNOWLEDGE.

5. Give, in tabular form as far as possible, the sources from which you would obtain the information necessary to compile a cost sheet of any manufactured article with which you are familiar, specifying the article selected and the detailed particulars required.

6. State the defects of "cost plus percentage" type of contracts and what steps you would suggest should be taken to counteract them.

FINAL EXAMINATION.

(August, 1942.)

ADVANCED BOOK-KEEPING AND ACCOUNTS (INCLUDING LIMITED COMPANIES).

6. A manufacturer employs men and women to make a standard article for which there is an urgent demand exceeding the productive capacity of his works.

A man so employed is expected to complete an article in six hours and is paid 3s. an hour with a bonus at the rate of one-sixth of the wages so calculated for each hour saved. A woman is expected to complete an article in nine hours and is paid 2s. an hour with a bonus at the rate of one-tenth of the wages so calculated for each hour saved.

In a test period it is found that the average time taken to complete an article is five hours for a man and seven hours for a woman.

Calculate the wages cost per article made by a man and a woman respectively in the test period, and indicate briefly other factors to which regard should be had in considering the question whether it is more advantageous to employ men or women.

The Society of Incorporated Accountants and Auditors

INTERMEDIATE EXAMINATION.

(July, 1942.)

COST ACCOUNTS.

(Time allowed: One hour.)

1. Explain the terms:
   (*a*) Retention Money;
   (*b*) Perpetual Inventory;
   (*c*) Machine Hour Rate;
   (*d*) Foundry.

2. You are informed by a Client, who is partly engaged on work for a Government Department, that the accountant acting for the Department refuses to allow the whole or any part of his expenditure on (*a*) Advertising, and (*b*) Contributions under the War Damage Act, when computing a rate of Establishment Charges for a given period. You are asked to give your considered opinion as to this in the form of a Report.

3. What are the arguments for and against taking profit on uncompleted contracts to the credit of a Contractor's Profit and Loss Account? How would such profit ordinarily be computed?

4. If you were checking a contractor's cost accounts, what steps would you take to ensure the detection of forged wages sheets if such were put before you in substantiation of Direct Labour Charges?

5. The G.X. Company has entered into leases of three tracts of gravel-bearing land, agreeing to pay a royalty of 6d. per cubic yard on the gravel excavated, with a minimum

rent of £240 per annum in each case. Excavators are being installed to remove the overburden and subsequently to dig out the gravel. Light railway equipment has been delivered for conveying the gravel to dumps and loading stages.

The Company asks you to report to them as to the advisability or otherwise of keeping Cost Accounts, and to inform them in general terms of the nature of the records and returns that would be required.

FINAL EXAMINATION.

(July, 1942.)

COST ACCOUNTS.

(Time allowed: One-and-a-half hours.)

1. Under which system of costing would you place the following:
   (*a*) Chemical Industry;
   (*b*) Collieries;
   (*c*) Electric Light and Power Undertakings;
   (*d*) Shipbuilding;
   (*e*) Furniture Manufacturing?

   Give reasons for your classification.

2. Give a tabular illustration of the working of the premium bonus system of wages.

3. Draft a *pro forma* account showing the method of calculating a machine-hour rate assuming that the standard working hours of the machine are 1,200 per annum and the effective working life ten years.

4. Draft a form of Works Cost Sheet, with suitable rulings, outlining the items of cost to be taken into account in the case of one of the following industries:
   Timber Importers with Saw Mills.
   Boot and Shoe Manufacturer.
   A Textile Mill.

5. The expenditure of S.U. Limited in the manufacture of the Commodity "A" for the comparative periods named was:

	Four weeks ended 30/3/40	Four weeks ended 29/3/41
	£	£
Raw Materials	5,100	5,600
Fuel	1,340	1,380
Electric Power	260	268
Progress Wages	12,060	12,700
Repairs	416	480
Light and Water	80	80
Rent	400	400
Rates	60	60
Carriage	184	212
Salaries	1,400	1,400
General Expenses and Administration	1,000	1,000
Depreciation	500	500
	£22,800	£24,080
Total Tons	30,400	34,400

Prepare a Cost Sheet showing the comparative costs per ton for each of the two periods, each item to be shown separately.

6 In process costing describe the operation in case of a manufacture where three processes of manufacture take place:

(*i*) Outlay £1,400;
(*ii*) ,, £560;
(*iii*) ,, £640.

The Association of Certified and Corporate Accountants

FINAL EXAMINATION—SECTION I

(*June*, 1942.)

COST ACCOUNTS AND SYSTEMS OF COSTING.

(*Time allowed*: *One-and-a-half hours.*)

Brevity and arrangement will be taken into account in marking. Please arrange your answers in their sequential order.

1. What is meant by the man-hour method of allocating Oncost? What are the conditions essential to a satisfactory use of this method?

The earnings of three different operators engaged on the same process for one week were:

	1			2			3		
	£	s.	d.	£	s.	d.	£	s.	d.
Wages (piece work)	4	19	0	5	18	0	3	6	6
And the Oncost at 2s. 6d. per hour applied to the cost of this process amounted to	6	0	0	6	0	0	6	0	0
	£10	19	0	£11	18	0	£9	6	6

In costing this process, should these differences in the output of each operator be observed? If you think so, give reasons. If you think not, state why and suggest a better method.

2. The costs of three articles are made up as follows, viz.:

	1			2			3		
	£	s.	d.	£	s.	d.	£	s.	d.
Direct Wages	2	8	0		16	0	6	15	0
Material		14	0		16	0	3	12	6
	3	2	0	1	12	0	10	7	6
Oncost 80%	2	9	7	1	5	7	8	6	0
Cost (exclusive of selling, delivery and general administration) ...	£5	11	7	£2	17	7	£18	13	6

The total expenditure of the business for the year in which these costs were made up was:

	£
Wages, direct	100,000
Wages, indirect	40,000
Material	60,000
Manufacturing Oncost other than Wages ...	88,000
	£288,000

Is the above method of allocating Oncost a reliable one? Give reasons.

3. The following are the Departmental Oncosts and Oncost rates of a manufacturing business:

	£	£	%	%	%	%
	Fixed	Floating	Fixed	Floating	Total	Standard
Dept. A ..	960	2,370	33	80	113	100
Dept. B . .	870	530	38	23	61	75
Dept. C ...	80	370	20	90	110	70
Dept. D ...	330	830	17	43	60	75
Dept. E ..	680	690	30	30	60	75
Dept. F .	380	370	23	22	45	50

Explain the use of the terms Fixed, Floating, Standard, in this table.

In some cases the standard is exceeded, and in others it falls short of the total percentages given. Can you suggest a reason for this?

4. The following is a schedule of the expenditure of a manufacturing business for 1937, viz.:

	Departments		
	A	B	C
	£	£	£
Direct Wages	10,116	4,690	5,928
Indirect Wages	2,725	1,106	894
Toolmakers	629	528	242
Power Consumed	920	292	208
Shop Sundries	217	70	26
Repairs to Plant	548	281	75
Depreciation of Plant	272	325	169
Rent and Rates	992	535	529
Stationery for Manufacturing Depts.	50	32	69
Supervision	1,106	427	642
Storekeeper's Wages	128	156	110

	£
Direct Materials consumed	29,678
Advertising	1,259
Travellers' Salaries and Expenses	3,427
Salaries of Office Staff	3,162
Managing Director's Remuneration ...	1,500
Professional Charges	210
Rent and Rates of Offices and Showrooms ...	2,420
Miscellaneous Expenses	192
Bank Charges other than Interest	327
Printing and Stationery	430
Sundry Trade Subscriptions	16

Calculate the Oncost rate of each department, using the Direct Wages as the measure of the Oncost. Also calculate the percentage of establishment charges to total manufacturing cost. Why is some of the expenditure divided into A, B, and C, and some not?

5. The Direct Wages and Oncost expenses for each quarter of 1941 were:

	1	2	3	4
	£	£	£	£
Wages	20,000	30,000	36,000	45,000
Oncost	30,000	32,000	32,000	36,000

The variations are due to seasonal fluctuations in output. In the fourth quarter an estimated cost was prepared for tendering purposes as follows:

	£	s.	d.
Direct Wages ...	10	0	0
Oncost	8	0	0
	£18	0	0

Do you approve of this estimate? Give reasons for your answer.

6. What are the advantages of departmentalising the Oncost expense of a manufacturing business:
   (i) In controlling expenditure;
   (ii) In ascertaining the costs of individual products?

It is sometimes said that one advantage is the ascertainment of the profits of each department, but this is rarely true. Can you see why? In what circumstances can departmental profits be ascertained?

The Institute of Cost and Works Accountants

INTERMEDIATE EXAMINATION.
(*June,* 1942.)

COSTING. PART I—LABOUR.
(*Time allowed: Two hours.*)

(*Questions numbered* 1, 2, 3 *and* 4 *are compulsory. Candidates should attempt two only out of the remaining questions numbered* 5, 6 *and* 7.)

1. How would you determine the labour cost of work-in-progress in a chemical works, where there are apt to be large variations in the amount of work-in-progress at the end of individual months?

   Show a monthly labour account as it would appear in the cost accounts.

2. In a factory where each direct operator is paid piece work and there is no alternative to paying indirect operators day work, describe a method of control whereby total indirect wages would vary as nearly as possible in the same proportion as variation with direct wages.

3. Describe the duties of each department, and the equipment required, to account for the labour costs in a manufacturing organisation where there are, say, 1,000 employees.

4. What records would you require to be kept by transport vehicle drivers and their mates where a system of allowances based on the number of deliveries and collections per journey is in force?

How would you safeguard the Transport Contractor's interest under these conditions? Illustrate by draft forms where necessary.

5. Describe the routine of preparing and completing the Wages Sheet when using an addressing machine. What other purposes can the machine serve in the Wages Department?

6. In a small Works the question of installing a time recorder was discussed, and because of the scattered departmental location it was felt that the use of a centrally placed clock would result in too much time being lost in contacting the clock. Suggest means to overcome this difficulty.

7. Describe a method for the analysis of Wages and the form in which the analysis will result. State how the control totals will be obtained and to what source the analysis will be posted.

COSTING. PART II—MATERIALS.

(Time allowed: Two hours.)

(Questions numbered 1, 2, 3 *and* 4 *are compulsory. Candidates should attempt two only out of the remaining questions numbered* 5, 6 *and* 7.)

1. A proposal is made to price stores issues at the last known price. Give your views on the advantages and disadvantages of such a system and state how you would value stores at stock-taking.

2. Outline the points on which you would require to be satisfied before passing invoices for payment for materials received, and the means by which you would ensure that payments for materials and services are not duplicated.

3. Justify the use of the replacement value of materials in product costs instead of the actual cost.

4. There is a considerable discrepancy between the Book Value of finished stocks and the valuation of the stock as taken physically at the year end. What are the likely causes of this discrepancy and what system would you introduce in order to tighten the control?

5. Draft a Material Waste Report in any industry with which you are familiar, and state how the figures would be obtained.

6. In certain industries material of a given grade or quality is purchased, which necessitates re-grading, thereby securing several grades of material of differing market values. State how you would apportion equitably over several grades a cost which applies jointly to all.

7. A factory uses large quantities of coal for power and for heating kilns. Discuss the problems involved in attempting to keep exact stock records and say how you would overcome difficulties.

COSTING. PART III—GENERAL EXPENSES.

(*Time allowed*: *Two hours.*)

(*Questions numbered* 1, 2, 3 *and* 4 *are compulsory. Candidates should attempt two only out of the remaining questions numbered* 5, 6 *and* 7.)

1. Upon what basis would you allocate the cost of the following service departments:
   (*a*) Those which render service of a clerical or office type;
   (*b*) Those which render service in connection with the handling of materials;
   (*c*) Those which render service of a mechanical nature, or which require extensive mechanical equipment for their operation;
   (*d*) Those of a general nature which render service in the form of comfort or convenience, or other departments which incur expenses of a miscellaneous nature?

2. If Overheads are analysed into the three undermentioned groups:
   (*a*) Works;
   (*b*) Administration:
   (*c*) Selling and Distribution;

   describe the methods by which you would absorb these Overheads in a system of multiple costing.

3. Draft a statement of Selling Overhead Costs, showing how the expenses against the individual items are controlled.

4. How is ' Idle Capacity ' ascertained, and how would you deal with it in the cost accounts?

5. How would you deal with expenditure incurred in the running of an Apprentice School? When giving your answer assume that a certain amount of saleable productive work is carried out in the school.

6. State how you would deal with under-absorbed or over-absorbed Overheads, at the end of a financial period. Assume that a system of pre-determined rates is in operation.

7. How would you allocate Selling and Distribution expenses to markets? What is the purpose of such allocations?

COSTING. PART IV—METHODS.

(Time allowed: Two hours.)

(Questions numbered 1, 2, *and* 3 *are compulsory. Candidates should attempt two only out of the remaining questions numbered* 4, 5, *and* 6.)

1. Describe and discuss the uses of three of the following:
   - (*a*) Pie Chart;
   - (*b*) Gantt Chart;
   - (*c*) Z Chart;
   - (*d*) Bar Chart;
   - (*e*) Logarithmic Graph Paper.

2. Give a detailed description of the operation of control accounts within a complete cost system for a large Works. Explain the object of the use of controls, and point out their value to the Cost Accountant.

3. Design a Plant Ledger Sheet. Discuss the principal uses of a Plant Ledger and indicate any other purpose it can serve.

4. The Directors of a Departmental Store desire to know the cost of selling by:

   (*a*) Salesmen;

   (*b*) Departments;

   (*c*) Terms of sales;

   (*d*) Methods of delivery.

   Outline the method by which you would obtain each of the analyses.

5. Show the method you would follow to produce a monthly reconciliation between charges passed through the financial accounts, and expenses absorbed into costs of completed jobs. Prepare one or more skeleton schedules to be used for localising over-absorptions and/or under-absorptions.

6. State as clearly and concisely as possible the lines upon which you would proceed to prepare and present cost figures designed to be used for purposes of comparison within an industry which has not adopted a uniform method of cost accounting.

The Royal Society of Arts

STAGE III—ADVANCED.
(*June*, 1942.)

COSTING.
(*Time allowed: Three hours.*)

(*First and Second-class Certificates will be granted in this Stage.*)

1. What do you understand by the term Oncost (or Overhead) Expenses? Into what main divisions are these expenses usually divided? Quote four items of expenditure which would appear under each of the divisions you have mentioned.

2. Draw up a specimen Stores Ledger sheet for use in conjunction with a Raw Material Stores in one of the following industries:

Boot and Shoe Manufacture, Gas Undertaking, Soap Manufacture or Coal Mining. Indicate how the Stores Ledger balances are agreed with the physical stocks.

3. Describe briefly the different types of office machinery which can be used with advantage in the production of the Pay Roll for a Works employing upwards of 5,000 operatives.

4. What wages records would you need for outworkers engaged on erection work under a Foreman Erector? Explain the methods to be used to provide the Head Office with satisfactory control over the money drawn by the Foreman for Wages payments to the outworkers.

5. What purposes are served by the Work in Progress Account? Explain how this Account is built up.

6. Draw up a specimen Plant Record sheet for a Machine Tool, and explain how Depreciation should be calculated and recorded.

7. In an Engineering Works comprising four main production shops in one of which the final products are assembled, owing to the variety of jobs passing through the Works it is found that Assembly is frequently held up by congestion in the production facilities of one or other of the production shops. Explain how the Overhead Absorption Accounts would reflect the unbalanced loading of the four shops.

The London Chamber of Commerce

(NOTE: *No papers have been set on Costing subsequent to November,* 1940).

HIGHER COMMERCIAL EDUCATION CERTIFICATE.

(*November,* 1940.)

COSTING.

(*Time allowed: Three hours.*)

Candidates may attempt all questions.

1. The Managing Director of a concern with a large number of employees, for whom a Catering Department is maintained, finds that there is a considerable loss on that department;

the intention is that employees shall be charged a sum which will just cover cost. You are instructed to investigate the matter and prepare a system of costing and charge which will carry out the intention of the Board. You may assume whatever facts you like as having been discovered in your investigation. Write your report and recommendations.

2. A factory employs 150 men and women on a time basis. Its output consists of a range of ten distinct small articles each of which passes through three processes or operations. Owing to rather rapid development its system of wage record and payment both seem unsatisfactory. Describe fully a system which you consider would be suitable, including indications of the method of analysis which you would require for costing purposes.

3. Explain the working of Stores Control Accounts in an engineering works. If at the time of making a physical check the quantities should be found to differ considerably from the totals shown in the records what conclusion would you draw and what action should be taken?

4. On what basis should work in progress be valued for the annual accounts of a manufacturing business, assuming that prices of raw materials have risen steeply during the accounting period?

5. Occasionally it is found that a particular business possesses individual characteristics which make a costing system impracticable. Briefly describe such a business and suggest causes which would lead you to give advice in this sense.

6. The Rowan Colliery Company has the following balances on its books in respect of the month ended 30th September, 1940:

	£
Stock of Coal at 1st September was 1,000 tons ...	750
Wages paid—	
Colliers	3,500
Underground	1,600
Surface	1,000
Timber	660
Stores	150

	£
Royalties	650
Depreciation (for the month)	500
Repairs	200
Stable Expenses	120
Rent and Rates	200
Pithead Office—	
Salaries	100
Postages, Telephones, etc.	50
Insurances	150
Heating and Lighting	50
Selling Expenses—	
Agency Charges	250
Advertising	50
Office Sundries	40
Bank Charges	50
Discounts, Dr.	200
Bad Debts	50
Rents of Cottages, Cr.	100
Coal Sales 8,800 tons	13,750

The value of the Coal Stock at the 30th September, 1940, was £1,150 (1,200 tons).

Calculate Pithead Cost and Total Cost per ton produced and prepare a statement for the Board showing the result of the month's working.

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